THREE-BOOK SERIES

STRAYER-UPTON ARITHMETICS

LOWER GRADES

Carl
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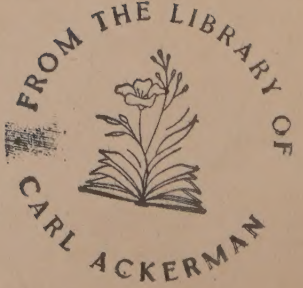

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STRAYER-UPTON ARITHMETICS

LOWER GRADES

BY

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Third Grade

Earl Ackerman

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STRAYER-UPTON ARITHMETICS, LOWER GRADES

W. P. 8

MADE IN U.S.A.

PREFACE

THIS series of books aims to give the child the ability to compute easily and accurately, and to enable him to interpret and solve the quantitative situations which he will meet in life. In the achievement of this aim, these books incorporate the most valuable findings of modern experimentation in the teaching of arithmetic, including the results of important researches conducted by the authors themselves during the past ten years. These books conform to the best modern courses of study and present only those methods and materials which have been thoroughly tested in the classroom by many experienced teachers. In no place do they introduce untried theories.

It is an established principle of teaching that nothing stimulates a pupil's interest so much as the satisfaction he gets from his ability to do things successfully. If he finds himself steadily perfecting new skills in arithmetic, he will look forward to his arithmetic period and will approach each new problem with intelligent interest. In accordance with this principle, these texts require the pupil to take only one new step at a time and supply him with enough exercises to assure mastery of that step before proceeding to the next one. Thus the constant stimulus of success is made possible for the pupil.

In this book, which covers the work of the **Lower Grades,** the following additional features are to be noted:

1. The book is written for children, in language with which they are familiar.

2. The problems relate to the life and interests of the pupils. Artificial and technical problems have been avoided.

3. New points are explained as simply as possible, and each accomplishment is applied in new situations as soon as it is acquired.

4. The abstract exercises have been so constructed as to provide drill on all the fundamental number combinations, with ample repetition of those recognized as most difficult. The pupil thereby acquires that automatic mastery of the basic combinations which is so essential to rapid and accurate computation.

5. Checking is taught early in the presentation of each new operation and is emphasized throughout the book.

6. Subtraction is presented in such a way as to avoid many of the difficulties usually encountered in the teaching of this subject.

7. In long division a new and extensive gradation of materials is given, which greatly simplifies the teaching of this important topic.

8. Special provision has been made for the individual differences of pupils by the inclusion of a large number of carefully graded exercises. From these the teacher can easily select the types of drill material suitable to meet the needs of special groups of pupils.

Chapter I of this book is a review of the work usually done in the second grade; Chapters II and III cover the work usually given in the third grade; while Chapters IV and V cover the work of the fourth grade.

George Drayton Strayer
Clifford Brewster Upton

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LOWER GRADES

CHAPTER I

COUNTING

1. Count the dogs in this picture. How many are there?

2. How many white dogs are there? how many black dogs?

3. How many dogs are in the first row? How many dogs are in the second row?

4. How many ears has each dog? Count the ears by 2's.

5. Count the dogs in the picture backward, like this: 16, 15, 14, 13, and so on until you come to 1.

6. Count the children in your class who are present to-day. How many are present?

7. Try to count to 100 by 2's.

PLAYING TENPINS

These children are playing tenpins.

1. Grace rolls a ball and knocks down 5 pins; then she rolls another ball and knocks down 3 pins. Her score is 5 and 3. Frank says that this makes 8. Is he right?

$$\begin{array}{r} 5 \\ 3 \\ \hline 8 \end{array}$$

2. Roy knocks down 3 pins with one ball and 4 pins with another. How many are 3 and 4? What is Roy's score?

$$\begin{array}{r} 3 \\ 4 \\ \hline 7 \end{array}$$

3. The numbers below show how many pins other children knocked down. Find their scores.

Edna	*Anna*	*Mary*	*John*	*Fred*	*Joe*	*Will*	*Bob*
4	8	2	1	5	9	7	6
3	1	3	4	2	1	2	2

Paul	*Rose*	*Lena*	*Phil*	*Alma*	*May*	*Tess*	*Tim*
3	2	1	4	4	6	3	3
6	8	9	5	2	4	7	5

PLAYING BASEBALL WITH NUMBERS

To play baseball, divide the class into two teams. Draw a baseball field like this on the blackboard.

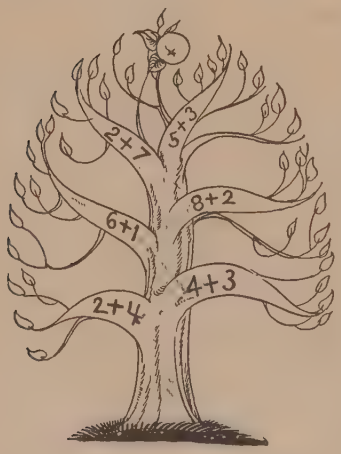
Ted is the first batter on one team. The teacher points to any two numbers at the place marked "Home." If Ted gives their sum correctly, he has hit the ball. He then begins to run around the field.

At each base the teacher points to two numbers and Ted adds them. If he gives the right sum at each base, including the home base, he makes one run. Hence, after hitting the ball, he must get four sums correct to make a run for his team. If Ted makes a mistake, the other team calls "Out." Then the first player of the other team is the batter.

The team that makes the most runs wins.

CAN YOU GET THE GOLDEN APPLE?

In a garden there is a magic tree which has a golden apple at the top. To climb the tree and get the apple, you must add the numbers on each branch as you go up. On the first branch you see $2 + 4$, which means 2 and 4.



$+$ means *and*. Sometimes it is read *plus*.

$=$ means *are*. Sometimes it is read *equals* or *equal*.

$2 + 4 = 6$ means 2 and 4 are 6. When you find that $2 + 4 = 6$, you are *adding*. 6 is called the **sum.**

Try to climb the tree. If you give all the sums correctly, you will get the golden apple. If you make a mistake, the branch will break and you will fall to the ground.

The sums below are on the branches of magic trees. Divide your class into two teams and see how many golden apples each team can get.

1.	**2.**	**3.**	**4.**	**5.**
$2 + 1$	$5 + 5$	$2 + 6$	$9 + 1$	$3 + 1$
$6 + 2$	$4 + 1$	$4 + 2$	$7 + 2$	$2 + 3$
$4 + 5$	$7 + 1$	$7 + 3$	$4 + 4$	$2 + 8$
$3 + 7$	$3 + 4$	$4 + 6$	$5 + 2$	$3 + 6$

WHAT SCORE CAN YOU MAKE?

Play this game. Write the numbers on paper and pin them on the baskets. You have two bean bags. If you throw a bag into a basket, the number on the basket tells how much it counts. If the bag falls on the floor, it counts *zero*. Zero is written like this, 0, and means *not any* or *nothing*.

1. Elizabeth throws one bag into 5 and one into 2. What is her score?

2. Tom throws one bag into 4. As the other bag falls on the floor, it counts 0. How many are $4 + 0$?

$$\begin{array}{r} 4 \\ 0 \\ \hline 4 \end{array}$$

3. Fred's first bag falls on the floor. His second one also falls on the floor. Fred's score is $0 + 0$. How many is that?

$$\begin{array}{r} 0 \\ 0 \\ \hline 0 \end{array}$$

4. Here are the scores of some of the other boys and girls. Add them quickly:

5	0	4	2	5	0	4	3
3	5	3	5	5	0	5	0

USING ADDITION

1. Sam had 2 white rabbits. His father gave him 5 rabbits more. How many rabbits did Sam have then?

2. At Bella's party there were 6 girls and 4 boys. How many children were at the party?

3. Elsa's doll had 3 pink dresses and 6 blue dresses. How many dresses had the doll?

4. Ann had 3 cents. Her mother gave her 2 cents more. How many cents had she then?

5. Jane bought a pencil for 2 cents and a balloon for 7 cents. How many cents did she spend?

6. Paul bought a top for 4 cents and marbles for 6 cents. How much money did he spend?

7. Ruth spent 4 cents for milk and 3 cents for crackers. How much did she spend for both?

8. Doris earned 6 cents yesterday. To-day she did not earn anything. How much did she earn in both days?

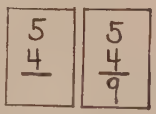
9. James put 5 cents in his new bank on Monday and 4 cents the next day. How much money was in the bank then?

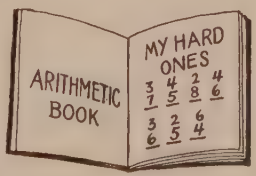
10. George had 5 cents. He earned 5 cents more by running an errand. How much had he then?

11. Sarah and her brother Edwin wanted to buy a kite. Sarah had 3 cents and Edwin had 7 cents. How much did both together have?

HOW JOHN LEARNS TO ADD WELL

Anna is testing John to see how well he can add. She shows him a card like *A* for a moment and he tells the sum as quickly as he can. The answer is on the back of the card, as shown at *B*. If John gives the right answer, he gets the card. If he gives the wrong answer, Anna shows him the right answer on the back of the card. Then she puts the card in a pile at the side to show that John missed it. When they have finished, John counts the cards he got right. He writes the ones he missed in his arithmetic notebook and studies them carefully. Anna will test him to-morrow on these hard ones.





Make a set of 64 cards like those above. Each card should have on it one of the sums on page 8. Then ask some child to test you. If you miss on any of the cards, copy them in your notebook and study them.

NOTE TO TEACHER. The 64 cards should later be increased to include each of the 100 combinations given on page 30.

CHART I. 64 ADDITION COMBINATIONS

Here are all the combinations whose sum is 10 *or less. Practice them until you can give all the sums orally in* 2 *minutes. The ones in black type are the hardest ones.*

1.	4	**8**	1	6	1	4	5	0
	2	**2**	1	1	0	0	5	8
2.	1	0	**1**	2	7	**2**	3	0
	4	3	**8**	3	0	**7**	2	0
3.	2	9	**3**	8	1	0	3	**6**
	1	0	**5**	1	2	4	1	**4**
4.	0	5	**1**	5	7	5	4	3
	2	0	**6**	2	1	1	3	0
5.	**1**	8	3	**3**	0	**1**	2	0
	7	0	3	**6**	5	**5**	4	6
6.	6	**2**	0	**1**	0	**3**	**4**	**3**
	0	**5**	1	**9**	7	**7**	**6**	**4**
7.	**7**	2	**2**	0	5	**4**	**7**	6
	3	0	**6**	9	3	**5**	**2**	3
8.	1	9	6	4	**2**	2	4	**5**
	3	1	2	1	**8**	2	4	**4**

HOW TO ADD SEVERAL NUMBERS

1. Rose had 4 dolls. At Christmas her mother gave her 2 dolls and her aunt gave her 1 doll. How many dolls had she then?

This is the way to find out:

$$\begin{array}{r} 4 \\ 2 \\ 1 \\ \hline 7 \end{array}$$

Start at the bottom and think "1 and 2 are 3." Then think "3 and 4 are 7." You can add these numbers more quickly by saying only "3, 7."

2. Robert had 6 cents. His father gave him 3 cents and his sister gave him 1 cent. How many cents had he then?

$$\begin{array}{r} 6 \\ 3 \\ 1 \\ \hline \end{array}$$

Make up some stories that use these numbers. Then add the numbers:

3.

1	1	1	4	1	2	3	6
5	2	7	3	6	7	5	1
1	2	2	1	1	1	1	1

4.

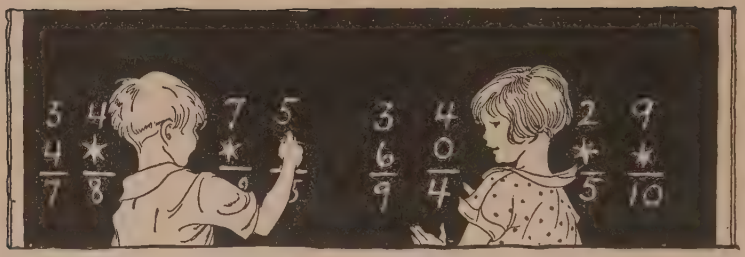
1	8	1	5	3	5	4	3
6	0	3	2	3	0	4	1
2	1	3	2	4	5	1	5

5.

1	1	2	5	3	2	2	9
1	4	5	1	1	0	5	0
8	2	3	4	6	7	1	1

6.

1	2	1	1	6	4	4	6
1	3	3	0	2	3	1	2
0	1	0	1	0	1	2	0
2	4	4	7	2	2	3	1



CAN YOU FIND THE MISSING NUMBERS?

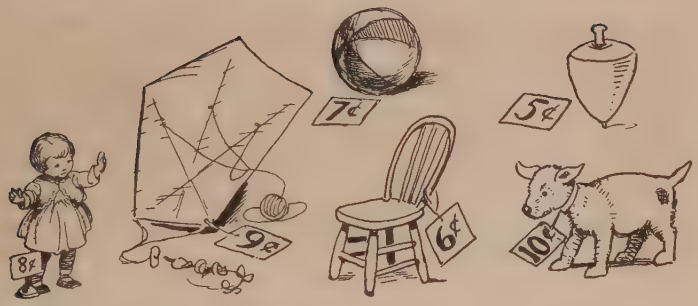
1. 4 + * are 9? Can you tell what number is missing where the star is? The missing number is 5, because 4 and 5 are 9.

$$\begin{array}{r} 4 \\ * \\ \hline 9 \end{array} \qquad \begin{array}{r} 4 \\ 5 \\ \hline 9 \end{array}$$

2. One of the children is a Blue and the other is a Red. The first child to write all the missing numbers correctly wins a point for his team.

When both children have finished, erase the answers and let another Blue and another Red race to find the missing numbers. The teacher will then write new problems on the board, like those below:

The Reds do these:					*The Blues do these:*				
1.	3	4	7	5	**1.**	3	4	2	9
	*	*	*	*		*	*	*	*
	7	8	10	5		9	4	5	10
2.	1	5	7	0	**2.**	2	3	5	1
	*	*	*	*		*	*	*	*
	10	9	8	7		9	6	7	1



HOW MUCH MORE DO I NEED?

The sign ¢ is often used for *cent* or *cents*. Thus, 5 cents may be written 5¢.

1. Susie has 5¢. How many more cents does she need to buy a doll?

2. Arthur has 7¢. How many more cents does he need to buy a dog?

3. Alice has 3¢. How much more does she need to buy a chair for her doll?

Tell what numbers should be put in place of the dots:

4. I have 6¢. I need . . .¢ more to buy a doll.

5. I have 3¢. I need . . .¢ more to buy a dog.

6. I have 6¢. I need . . .¢ more to buy a ball.

7. I have 4¢. I need . . .¢ more to buy a top.

8. I have 7¢. I need . . .¢ more to buy a kite.

9. I have 5¢. I need . . .¢ more to buy a dog.

10. I have 3¢. I need . . .¢ more to buy a doll.

11. I have 6¢. I need . . .¢ more to buy a kite.

A NEW PLACE FOR THE MISSING NUMBER

1. What number must be added to 2 to make 7?

You see that 5 is the missing number because 2 and 5 are 7. This time write the numbers in new places. Make 7 the top number and write 2 below it; then draw a line and put the missing number, 5, below the line where you see the star.

7	7
2	2
*	5

Tell what number you must add to 2 to make the top number. Tell what number should be put in place of the star:

2.	4	5	10	9	3	6	8	2
	2	2	2	2	2	2	2	2
	*	*	*	*	*	*	*	*

Tell what number you must add to 3 to make the top number:

3.	10	8	4	7	6	9	5	3
	3	3	3	3	3	3	3	3
	*	*	*	*	*	*	*	*

Tell what number you must add to the lower number to make the top number:

4.	9	8	9	6	10	8	7	4
	1	7	4	4	5	4	4	4

When you find how much you must add to a smaller number to make a larger number, you are subtracting.

HOW MUCH CHANGE SHOULD YOU GET?

1. Charles buys a top for 3¢ and gives the clerk 10¢. How many cents change should he get?

Write 3 below 10, as shown here. Then think "3 and what are 10?"

You find that Charles should get 7¢ change because 3 and 7 are 10.

$$\begin{array}{r} 10 \\ 3 \\ \hline 7 \end{array}$$

2. Joe buys a top for 4¢ and gives the clerk 10¢. How many cents change should he get?

How many cents change should you get if

3. You buy a ball for 6¢ and give the clerk 10¢?

4. You buy a doll for 2¢ and give the clerk 5¢?

5. You buy marbles for 7¢ and give the clerk 10¢?

6. Bill buys a pencil for 1¢ and a ball for 4¢. How many cents does he spend? How many cents change should he get from 10¢?

7. Lucy buys a doll for 4¢ and an elephant for 5¢. How many cents change should she get from 10¢?

8. Pearl pays 6¢ for a notebook and 2¢ for candy. How many cents change should she get from 10¢?

9. Irwin spends 1¢ for a whistle, 1¢ for candy, and 5¢ for a ball. How many cents does he spend? How much change should he get from 10¢?

10. Louis buys a pencil for 2¢ and a ruler for 3¢. Does he get any change from 5¢?

HOW MANY ARE LEFT?

1. Alice has 6 dolls. She gives 2 dolls to Rose. How many dolls has Alice left?

Think "2 and what are 6?" Alice has 4 dolls left because 2 and 4 are 6.

2. Tom has 7¢. He spends 3¢ for candy. How many cents has he left?

Write 3 under 7. Then think "3 and what are 7?" Tom has 4¢ left because 3 and 4 are 7.

$$\begin{array}{r} 7 \\ 3 \\ \hline * \end{array} \qquad \begin{array}{r} 7 \\ 3 \\ \hline 4 \end{array}$$

3. Jack has 7 marbles and loses 2 marbles. How many marbles has he left?

4. Ben had 8 rabbits, but 4 of them ran away. How many rabbits had Ben left?

5. There were 4 apples on the table. Mary took away 1 apple. How many apples were still on the table?

6. Janet had 9 jackstones. She gave 4 of them to her sister. How many jackstones had Janet left?

7. Mother had 10 eggs. She used 5 eggs for a cake. How many eggs were left?

8. Billy had 5 little cakes. He ate 1 cake. How many cakes had he left?

9. Ruth and Harry caught 8 fish. Mother cooked 5 fish for lunch. How many fish were left?

When you find how many are left, you are subtracting.

A NEW WAY TO WRITE SUBTRACTION

1. Jack had 9¢ and gave 5¢ to Betsy. How much did Jack have left?

To find out, *subtract* 5 from 9. Write 5 under 9, and think "5 and what are 9?"

$$\begin{array}{r} 9 \\ 5 \\ \hline 4 \end{array}$$

Subtract the lower number from the upper number:

In the first example, think "8 and what are 9?"

2.	9	8	10	9	5	9	6	8
	8	8	1	2	5	7	1	6
3.	1	4	8	3	6	8	4	7
	1	0	5	1	5	1	3	1
4.	9	7	2	7	10	9	10	9
	6	2	0	7	9	3	6	4

5. To subtract 5 from 9, we may write the example like this: $9 - 5 = 4$

The sign $-$ means *take away* or *subtract.* We read it *less.* Thus, "$9 - 5 = 4$" is read "9 less 5 equals 4."

Tell what number should be put in place of the dots:

6. 9 less 1 are . . .
7. 8 less 7 are . . .
8. 4 less 4 are . . .
9. 7 less 4 are . . .
10. 6 less 2 are . . .
11. 10 less 8 are . . .

Subtract these:

12.	$9 - 9$	$2 - 1$	$10 - 7$	$6 - 3$
13.	$10 - 5$	$7 - 5$	$7 - 0$	$8 - 4$

IN ALADDIN'S CAVE

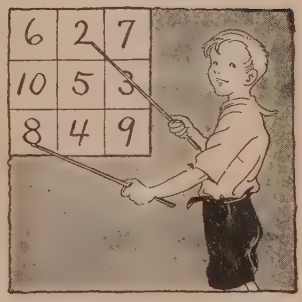
1. To reach the jewels in Aladdin's cave, you go down a flight of stairs. On the first step you must tell how many $7 - 4$ are. On the next step you must tell how many $8 - 7$ are.

After you have climbed down all the steps into the cave, you must go out by the stairs marked *Out*. If you make a mistake, you have fallen on the stairs. See which child can go into the cave and out again the most quickly without falling.

When you have climbed into and out of this cave, draw other caves. Use the following subtraction problems for the steps of the caves:

	In	*Out*		*In*	*Out*
2.	$10 - 3$	$4 - 2$	**3.**	$7 - 7$	$9 - 9$
	$6 - 6$	$9 - 1$		$1 - 0$	$7 - 6$
	$9 - 8$	$9 - 7$		$6 - 3$	$2 - 2$
	$6 - 5$	$10 - 1$		$6 - 2$	$8 - 2$
	$8 - 8$	$4 - 4$		$8 - 3$	$5 - 5$
	$4 - 1$	$6 - 0$		$10 - 2$	$10 - 4$
	$10 - 6$	$9 - 4$		$7 - 5$	$10 - 8$
	$9 - 6$	$10 - 5$		$8 - 6$	$7 - 3$

FINDING THE DIFFERENCE



Rob is the leader. He points to 8 and 2 and asks Will the *difference* between them. Will says that the difference is 6. He is right because 2 and 6 are 8. Then Rob points to two other numbers. If Will gives the wrong difference, Rob corrects him and Will takes his seat. If Rob does not notice Will's mistake, Rob must take his seat, too, and the one who first notices the mistake becomes leader.

Always point to both numbers at the same time.

Can you Guess the Number on your Back?

Jack does not know what number is pinned on his back. He chooses Alice to help him find out, asking, "Is it 9?" Alice answers, "No, it is 2 less than 9." Jack replies, "Then it is 7."

Then 8 is pinned on Jack's back. He chooses Sam to help, asking, "Is it 5?" Sam answers, "No, it is 3 more than 5." Then Jack says, "It is 8."

Other numbers are pinned on Jack's back and he continues to guess until he makes a mistake. The first one who notices the mistake takes his place.

CHART II. 64 SUBTRACTION COMBINATIONS

Practice these subtraction exercises until you can give all the differences orally in 2 minutes. The ones in black type are the hardest.

1.	6	**8**	**5**	7	**9**	**10**	**8**	**8**
	4	**2**	**1**	7	**5**	**4**	**3**	**1**
2.	8	**10**	7	6	**7**	4	**7**	2
	0	**2**	5	6	**1**	2	**4**	0
3.	**10**	7	4	8	9	10	**9**	6
	3	6	0	7	9	8	**1**	2
4.	5	8	**9**	9	4	1	**10**	5
	3	4	**2**	0	3	1	**1**	0
5.	8	9	**7**	**9**	4	3	9	5
	6	7	**2**	**4**	4	0	6	5
6.	10	6	3	6	2	6	10	4
	7	0	1	1	2	3	5	1
7.	3	9	2	**9**	0	5	**10**	6
	2	8	1	**3**	0	2	**6**	5
8.	**7**	1	5	3	8	8	10	7
	3	0	4	3	5	8	9	0

NOTE TO TEACHER. The above combinations should be put on cards for drill purposes, as suggested on page 7.

ADDING TENS

1. Count the cents in the piles above. How many cents are there in each pile? How many 10's make 40?

2. How many cents will there be in 5 piles containing 10 cents each? how many in 6 piles? in 7 piles? in 3 piles? in 9 piles?

3. How many 10's make 50? 60? 70? 80? 90?

4. Write forty in figures; also write thirty, fifty, sixty, seventy, eighty, ninety.

5. 10 tens make 100, which we call *one hundred.*

6. Count by 10's to 100.

7. How many are 2 tens and 4 tens? How many are 20 and 40?

$$\begin{array}{r} 40 \\ 20 \\ \hline 60 \end{array}$$

8. *Add these:*

10	20	40	60	10	50	60	70
30	30	40	20	40	30	40	10

9. Betty spent 40¢ for a doll and 30¢ for a book. How much did she spend in all?

10. Richard paid 10¢ for paper and 50¢ for a set of paints. How much did he spend in all?

LEARNING WHAT NUMBERS MEAN

11 means $10 + 1$.

12 means $10 + 2$.

13 means $10 + 3$.

1. What does 14 mean? 15? 16? 18? 19? How many are $10 + 7$? $10 + 8$? $10 + 9$?

2. 21 means $20 + 1$. There are 21 coins in the picture. What does 22 mean? 23? 28? 29?

3. 31 means $30 + 1$. Tell the meaning of 41; of 42; of 53; of 76.

4. Count to 100. Begin with 31 and count to 60.

5. What number comes next after 45? after 63?

6. What numbers come between 33 and 36? between 49 and 53?

7. Write the numbers up to 50 on cards. Pick out any 10 of these cards and put them on the ledge of the blackboard all mixed up, like this:

17 5 11 15 9 2 28 16 25 7

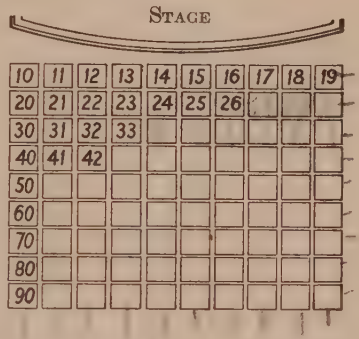
Now put these cards in their right order, like this:

2 5 7 9 11 15 16 17 25 28

Then tell what numbers are missing between each two cards. Thus, 3 and 4 come between 2 and 5.

SELLING TICKETS TO THE SCHOOL PLAY

Tom is selling tickets for the school play. The picture shows how the seats are numbered.



1. There are 10 seats in each row. Draw a picture like this and put in all the missing seat numbers.

2. Tom makes tickets for each seat. The first ticket is number 10 and the last one is number 99. He puts the tickets for each row in separate piles so that he can find them quickly when he sells them. How many piles has he?

3. In the first pile he puts tickets 10 to 19. What tickets will he put in the second pile? in the fifth?

4. Marion gets ticket 33. In what row is that?

5. Ida wants a seat in the second row. Tom gives her ticket 53. Is that right? What numbers could he give her?

6. Rose has ticket 23 and Emma has ticket 27. Give the numbers of the seats between them. If Rose wants to sit next to Emma, what numbers should she ask for?

7. Make 90 tickets. Number them and put them in piles the way Tom did. Then quickly find these tickets: 15, 28, 82, 93, 45, 27, 61, and 89.

LEARNING TO USE THE CALENDAR

NOVEMBER						
SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

1. This is the calendar for November from a recent year. Read all the numbers on it.

2. Read the days in November like this: November first, November second, November third.

3. What date is Thanksgiving Day?

4. Point to the school days on the calendar and count them.

5. Name the months of the year and the days of the week.

6. What month is it now? What year is it?

7. What day of the week is this? what date?

8. On what date is Christmas Day? New Year's Day? Washington's Birthday?

9. Write the date of your birthday on the board.

10. Make a calendar for the present month similar to the one at the top of this page.

NOTE TO TEACHER. The year should be read in the usual way. Thus, 1929 is read "nineteen twenty-nine."

UNITED STATES MONEY

The coins most commonly used in this country are the *cent*, the *nickel*, the *dime*, the *quarter*, and the *half dollar*. Sometimes a large silver coin is used to represent a *dollar*, but more often a dollar bill is used. Your teacher will show you some coins and you should learn to know them.

The sign \$ means *dollar* or *dollars*. Thus, 2 dollars is written \$2.

Memorize these:

5 cents = 1 nickel	25 cents = 1 quarter
10 cents = 1 dime	50 cents = 1 half dollar
100 cents = 1 dollar	10 dimes = 1 dollar

Exercises

1. Using the sign \$, how do you write 3 dollars? 4 dollars? 10 dollars? 1 dollar? 7 dollars?

2. Lucy's aunt gave her a dollar bill for her birthday. How many cents is a dollar bill worth?

3. Every week Frank's father gives him a nickel and a dime as his allowance. Frank says that this makes 15¢. Is Frank right?

4. Jessie received a dime yesterday for running errands and Agnes received a nickel. How much more did Jessie get than Agnes?

5. How many cents equal 2 dimes and 1 nickel?

COUNTING MONEY

1. Rose has 6 new nickels. Each nickel is worth 5 cents. Count the nickels by 5's to see how many cents Rose has.

2. Count by 5's to 25. How many nickels make a quarter?

3. Suppose that you have 10 nickels. If you count them by 5's, you find that 10 nickels make 50 cents. How many nickels make a half dollar?

4. Each dime is worth 10 cents. How many 10's make 100? How many dimes make 100¢? How many dimes make $1?

5. Jack has $4 and Elsie has $6. How many dollars have both?

Tell what numbers should be put in place of the dots:

6. 2 nickels = . . . cents. 4 dimes = . . . cents.

7. 4 nickels = . . . cents. 7 dimes = . . . cents.

8. 1 nickel and 4 cents equal . . . cents.

9. 1 dime and 6 cents equal . . . cents.

10. 6 dimes and 1 nickel equal . . . cents.

11. 1 half dollar equals . . . dimes.

12. 1 quarter and 2 cents equal . . .¢.

13. 1 quarter and 1 dime equal . . .¢.

EIGHTEEN NEW SUMS

Here are 18 important sums for you to memorize:

9	2	8	3	9	3	7	4	8
2	9	3	8	3	9	4	7	4
11	11	11	11	12	12	11	11	12

4	9	4	6	5	7	5	8	5
8	4	9	5	6	5	7	5	8
12	13	13	11	11	12	12	13	13

If you forget what $3 + 9$ are, think of $9 + 3$. If you forget what $4 + 7$ are, think of $7 + 4$.

Add these as quickly as you can:

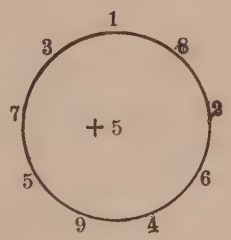
1.	4	9	3	4	8	5	5	4	5
	7	2	9	8	3	6	8	9	7

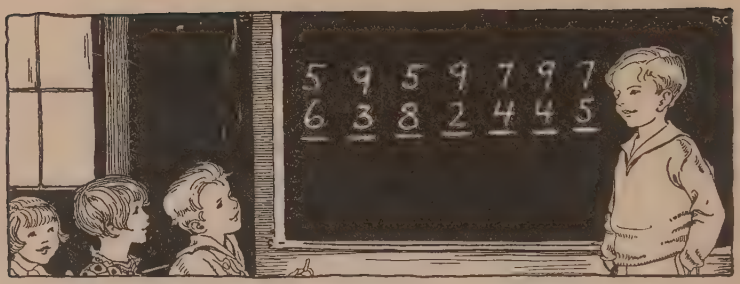
Subtract these. Think "3 and what are 11?"

2.	11	11	12	13	12	11	13	11	11
	3	2	9	4	8	9	9	7	6

3.	13	12	12	13	11	12	11	11	12
	8	5	7	5	5	3	8	4	4

4. Draw this circle on the board. Point to each number on the circle and add 5 to it. Change the number in the middle from 5 to 4 and add again. Then change 4 to 3 and add again.





GUESS WHAT ROBERT IS THINKING

Robert stands at the board and says, "I am thinking of two numbers whose sum is 11." The other pupils silently pick out those sums on the board that make 11.

Then Josie asks, "Is it 7 and 4 are 11?" Robert answers, "No."

Fred asks, "Is it 5 and 6 are 11?" "No."

Ada asks, "Is it 9 and 2 are 11?" "Yes."

Then Ada takes Robert's place at the board.

When the sums on the board have been used for a while, put these sums on instead:

1.	6	8	8	2	8	3	4	3	4	5
	4	3	5	9	4	7	7	9	9	7

Begin at the bottom and add up; then begin at the top and add down and see if you get the same sum:

2.	4	4	5	3	4	7	4	6	1	8
	2	3	4	2	5	2	0	1	2	0
	5	5	4	6	2	3	8	4	9	1

MORE NEW SUMS

Here are 18 other sums that you must memorize:

9	5	6	7	6	8	6	9	6
5	9	6	6	7	6	8	6	9
14	14	12	13	13	14	14	15	15

7	8	7	9	7	9	8	8	9
7	7	8	7	9	8	9	8	9
14	15	15	16	16	17	17	16	18

Add these as quickly as you can:

1.	8	6	9	5	8	9	7	9	8
	6	7	6	9	9	7	7	9	7

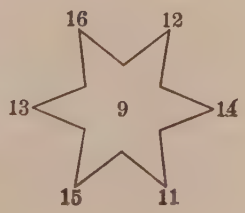
What numbers should be put in place of the stars?

2.	9	7	6	9	8	9	7	9	7
	*	*	*	*	*	*	*	*	*
	15	13	14	16	17	14	14	18	15

Subtract. Think "6 and what are 13?"

3.	13	16	14	12	15	14	17	15	16
	6	7	5	6	6	8	9	8	8

4. Draw this star on the board. Subtract 9 from each of the numbers on the points of the star. Change 9 to 8 and subtract again; then change 8 to 7; then change 7 to 6.



AN ADDITION MATCH

This class is divided into two teams. The Stars are in rows 1, 3, and 5. The Pirates are in rows 2, 4, and 6. The teacher shows the flash card $\frac{9}{5}$. All the pupils silently write the sum. Then the teacher shows another flash card and the pupils write its sum. After ten cards have been shown, the teacher reads the correct answers and the children mark each other's papers.

Now all the pupils whose papers were entirely correct should stand. If 5 Stars stand, then 5 is the score for that team. If 7 Pirates stand, then 7 is the score for the Pirates and they win the first test.

The teacher will then show ten more flash cards. After five tests, the team that has won the greater number of times is the final winner.

PROBLEMS

1. Yesterday Dick spent 5¢ for car fare and 7¢ for marbles. How much did he spend in all?

2. At the picnic Jane bought a pear for 4¢ and a box of crackers for 7¢. How much did both cost?

3. For his lunch Harry bought a sandwich for 7¢, a peach for 2¢, and a glass of milk for 5¢. How much did this lunch cost?

4. Tom paid 7¢ for a whistle and 8¢ for a top. How much did he pay for both?

5. Alma put 2¢ in her bank on Saturday, 5¢ on Sunday, 2¢ on Monday, and 5¢ on Tuesday. How much money was then in her bank?

6. Ruth is 7 years old. Her brother Charles is 13 years old. How much older is Charles than Ruth?

7. John gave 15¢ to the school Christmas fund and Harry gave 8¢. How much more did John give than Harry?

8. Robert caught 7 fish and Will caught 16 fish. How many more fish did Will catch than Robert?

9. Joan had 13 peanuts. She fed 9 peanuts to the squirrels. How many peanuts had Joan left?

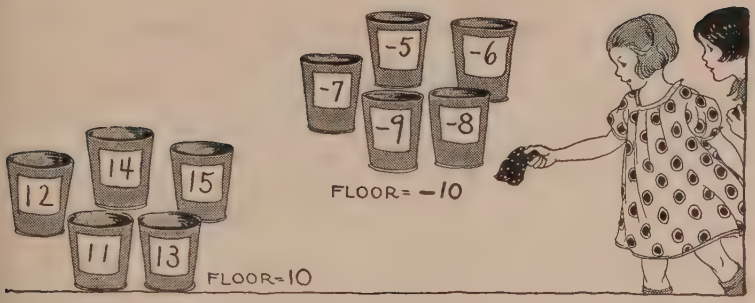
10. Stephen wants to buy a pencil that costs 15¢. He has saved 9¢. How much more does he need?

11. Helen must pay 5¢ for car fare. She hands the conductor a dime. How much change will she get?

CHART III. THE 100 ADDITION COMBINATIONS

Practice these until you can give all the sums orally in 3 minutes. The ones in black type are the hardest.

1.	**3**	1	**4**	1	6	0	1	6	2	1
	6	5	**7**	1	1	7	2	6	2	0
2.	**3**	**7**	5	**8**	5	**5**	3	6	**2**	0
	9	**4**	3	**6**	0	**9**	4	3	**6**	3
3.	**7**	**9**	3	4	0	1	**5**	4	7	**6**
	9	**4**	2	4	8	7	**6**	0	2	**8**
4.	3	**4**	8	2	0	4	**7**	6	1	9
	1	**5**	2	0	9	1	**5**	4	3	1
5.	**6**	3	5	**4**	**4**	2	**4**	5	1	0
	7	0	4	**8**	**6**	4	**9**	1	8	6
6.	**5**	**7**	0	3	**6**	**2**	5	9	**5**	4
	7	**7**	2	3	**5**	**8**	5	0	**8**	2
7.	2	**7**	2	0	8	**6**	1	7	9	**3**
	1	**8**	3	1	3	**9**	4	0	3	**8**
8.	6	9	**8**	**7**	6	3	**9**	**2**	8	8
	2	2	**8**	**6**	0	5	**6**	**7**	0	1
9.	**8**	5	**9**	7	1	0	**2**	7	**9**	8
	5	2	**8**	1	9	0	**9**	3	**5**	4
10.	**9**	4	**3**	0	**9**	**8**	1	2	**8**	0
	9	3	**7**	4	**7**	**7**	6	5	**9**	5



PLAYING BEAN BAG

Mary is a Red and Ida is a Blue. Mary has two bean bags. She tries to throw the first bag into a basket at the left. It goes into basket 15. She then throws the second bag into one of the baskets at the right. This bag goes into the basket marked − 6. Mary's score is 15 − 6, or 9.

Now Ida plays. She throws the first bag into 13 and the second into − 7. Her score is 13 − 7, or 6.

Mary wins because her score is 9 and Ida's is only 6. Mary is a Red, hence this counts as 1 point for the Reds.

Now Arthur, who is a Red, and Jack, a Blue, play the game. Arthur's first bag falls on the floor at the left and counts 10. His second goes into − 8. Then his score is 10 − 8, or 2.

Jack throws his first bag into 15; his second falls on the floor at the right, which takes off 10. What is his score? Which team gets a point?

Choose two teams and play this game.

CHART IV. THE 100 SUBTRACTION COMBINATIONS

Practice these until you can give all the differences orally in 3 minutes. Those in black type are the hardest.

1.	6	**11**	**9**	6	**8**	9	**16**	7	**13**	8
	3	**2**	**4**	0	**3**	6	**7**	3	**4**	1
2.	2	10	**15**	3	5	**12**	9	**14**	2	9
	2	9	**6**	0	1	**6**	5	**8**	1	8
3.	5	9	**11**	**10**	6	8	4	7	**12**	4
	4	0	**3**	**4**	1	5	3	5	**5**	4
4.	1	**11**	8	3	9	2	**15**	7	4	**14**
	0	**4**	8	1	7	0	**7**	4	2	**9**
5.	6	**12**	10	7	**11**	5	9	**16**	8	**17**
	5	**3**	6	0	**7**	3	1	**9**	7	**8**
6.	8	6	4	**13**	10	**14**	4	10	3	**11**
	4	2	0	**5**	8	**5**	1	5	2	**5**
7.	5	9	**12**	10	5	**13**	6	**14**	3	**14**
	0	9	**7**	7	5	**9**	4	**7**	3	**6**
8.	5	7	0	**8**	7	11	**12**	7	6	12
	2	2	0	**2**	7	8	**4**	1	6	8
9.	11	**13**	1	9	**10**	10	**15**	8	**17**	8
	9	**6**	1	3	**2**	1	**8**	6	**9**	0
10.	7	**13**	**10**	**9**	**11**	12	**15**	**13**	**16**	**18**
	6	**7**	**3**	**2**	**6**	9	**9**	**8**	**8**	**9**

ADDING BY ENDINGS

On page 30 you learned the 100 combinations in adding one figure to one figure. Now you must begin to learn how to add a number of two figures to one figure, like 12 and 4.

Study these sums. Then cover the answers with a card and see if you can remember them:

2	12	5	15	4	14	7	17
4	4	2	2	3	3	3	3
6	16	7	17	7	17	10	20

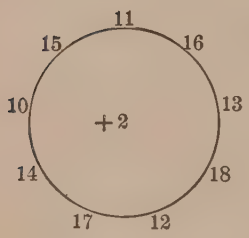
Oral Exercises

Add these as quickly as you can. Give only the sums:

1.	4	14	3	13	2	12	8	18
	2	2	3	3	5	5	2	2
2.	13	12	14	11	11	13	12	14
	5	6	5	6	2	4	7	1
3.	16	15	13	11	16	11	14	18
	2	3	7	5	3	8	6	1
4.	15	12	19	17	11	15	17	11
	5	8	1	1	9	4	2	4
5.	11	13	14	16	13	12	11	12
	7	6	4	4	2	2	3	3

MARY PLAYS AN ADDITION GAME

As Mary wants to be able to add well, she plays this addition game.



1. She draws this circle on the board. Then she points to each number on the circle and adds the 2 in the middle to it.

2. After Mary has gone all around the ring, she erases the number 18. She also erases the 2 in the middle and puts 3 in place of it. Then she goes around the circle again, adding 3 to each number.

3. Mary next erases 17 and puts 4 in the middle. This time she adds 4 to every number on the ring.

Mary continues to play the game in this way:

4. She erases 16, puts 5 in the middle, and adds.
5. She erases 15, puts 6 in the middle, and adds.
6. She erases 14, puts 7 in the middle, and adds.
7. She erases 13, puts 8 in the middle, and adds.
8. She erases 12, puts 9 in the middle, and adds.
9. She erases 11, puts 10 in the middle, and adds.

The game is now over, because there are no more numbers on the ring to erase. Mary tries to play the whole game without making a mistake.

You can play this game at home or in your classroom. It will help you to add quickly and correctly.

ADDING COLUMNS

If you have learned well the work on page 33, you are now ready to add any column of numbers whose sum is not more than 20.

When you add, begin at the bottom and add up. Thus, in adding the column below, say, "7, 11, 17, 19."

To be sure that 19 is the right sum, *check* the work by adding the numbers again, but this time begin at the top and add down, saying, "2, 8, 12, 19." If you get the same sum both times, your answer is probably right.

2
6
4
7
19

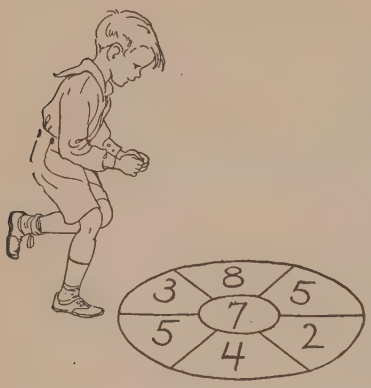
Practice in Adding

Add these numbers and check your work:

1.	3	5	4	2	3	3	4	4	2
	8	9	9	9	8	9	7	8	9
	4	2	4	3	5	6	6	3	7
2.	5	3	8	4	7	3	6	6	7
	7	9	0	9	7	9	8	7	8
	6	5	6	2	4	4	4	5	0
3.	6	4	9	0	5	5	9	3	8
	8	9	7	9	8	6	0	7	9
	3	6	4	8	4	8	9	8	2
4.	4	4	4	1	3	3	5	4	7
	5	0	2	6	2	1	4	7	0
	4	7	5	5	6	7	0	6	7
	3	5	8	4	7	4	6	3	4

PLAYING HOPSCOTCH

Each player hops three times. His score is found by adding the numbers of the three spaces into which he hops.



1. Ralph hops into 7, 8, and 3. As he hops, he adds, saying, "7 and 8 are 15, 15 and 3 are 18." Ralph's score is 18.

2. Maud hops into 5, 7, and 4. She adds by saying only "5, 12, 16." This is a much quicker way of adding than Ralph's way.

3. Fred hops into 5, 3, and 8 and adds as Maud does. What does he say? What is his score?

4. Here are the scores of some children who played Hopscotch. Which child won?

Tom	*Joe*	*Bob*	*Ann*	*Mary*	*Sam*	*Sue*	*Edna*
2	8	3	4	2	5	8	2
7	7	5	2	7	7	7	5
5	2	4	7	3	5	5	8

5. Play Hopscotch in your room. Add the way Maud does. The pupil with the highest score wins.

6. Change the 7 in the middle to 6 and play again.

ADDING TWO-FIGURE NUMBERS

Jane was saving money. She had 45¢ in her bank and put in 23¢ more. How much money had she then in her bank?

To find out, you must add 45¢ and 23¢.

Write 23 under 45 and draw a line.
Add 3 and 5, saying, "3, 8." Write 8 under 3.
Add 2 and 4, saying, "2, 6." Write 6 under 2.
The sum is 68. You see that Jane then had 68¢.

$$\begin{array}{r} 45 \\ 23 \\ \hline 68 \end{array}$$

Exercises in Adding

1. Jane spent 25¢ for a doll and 22¢ for a teddy bear. How much did she spend for both?

2. At the picnic there were 21 girls and 18 boys. How many children were there all together?

Add these:

3.	73	48	32	13	61	41	57
	16	51	47	85	13	47	12
4.	83	43	12	45	14	60	14
	15	12	26	54	24	39	83
5.	60	63	17	40	20	22	50
	27	16	61	29	60	53	42
6.	12	55	37	23	51	61	11
	47	30	12	64	21	15	70

SUBTRACTING TWO-FIGURE NUMBERS

Henry's uncle gave him 67¢. Henry spent 53¢ for a baseball. How many cents had he left?

You can find out by subtracting 53 from 67.

Write 53 under 67 and draw a line.

Then think, "3 and what are 7?" Write 4 under 3 because 3 and 4 are 7.

Think, "5 and what are 6?" Write 1 under 5 because 5 and 1 are 6.

The difference is 14. Hence Henry had 14¢ left.

$$\begin{array}{r} 67 \\ 53 \\ \hline 14 \end{array}$$

Exercises in Subtracting

1. Jane has 25¢ to spend. If she spends 12¢ for a doll, how many cents has she left?

2. In our class there are 45 children. Yesterday only 31 children were present. How many children were absent?

Subtract these and make stories about each one:

3.	96	39	57	58	77	46	98
	43	26	16	25	43	25	32
4.	97	49	89	78	98	85	69
	12	18	51	32	76	30	19
5.	58	50	92	87	79	63	97
	37	40	30	77	28	43	45

EVERYDAY PROBLEMS

1. Joan needs for her doll a pair of slippers costing 46¢ and a hat costing 30¢. How much will both cost?

2. Otto has saved 53¢ and his father gives him 25¢. How many cents has he now?

3. Jack and Jim are putting their savings together to buy a set of soldiers. Jack has 27¢ and Jim has 42¢. How much money have they to spend?

4. Jessie has two new story books. One book has 54 pages and the other has 44 pages. Jessie has read both books. How many pages has she read?

5. Helen buys 24 cookies for her party and her mother gives her 13 more cookies. How many cookies has she then?

6. Mary buys a book for 14¢ and gives the clerk 25¢. How much change should she get?

7. Fred has 78¢ in his bank. He takes out 25¢ to buy himself some paper and pencils for school. How much money is left in the bank?

8. Kate should practice her piano lesson 35 minutes each day. To-day she has practiced only 20 minutes. How many more minutes will she have to practice to-morrow to make up for this?

9. Jane has 46¢. She wants to buy a pair of gloves that costs 59¢. How much more money does she need?

HOW MANY OF THESE THINGS CAN YOU DO?

If you know your second-grade work well you can do all these things:

1. Count to 100. Count by 10's to 100.

2. Count by 2's to 100; by 5's to 50.

3. What number comes next after 37? before 21?

4. Tell what numbers come between 48 and 52; between 75 and 80; between 89 and 94.

5. Tell what day of the week this is. Write to-day's date. Write the date of your birthday.

6. Give correctly all the sums on page 30 in 3 minutes.

7. Do correctly all the subtracting on page 32 in 3 minutes.

8. Tell how many cents there are in 1 nickel; in 1 dime; in 1 quarter; in 1 half dollar; in 1 dollar.

Add these quickly:

9.

37	63	46	31	12	42	21
12	15	52	45	84	15	27

10.

2	4	9	3	6	7	8	4
8	8	4	9	9	9	5	8
5	3	4	2	3	2	7	6

Subtract these:

11.

59	92	48	76	67	84	54
21	42	35	24	46	70	41

CHAPTER II

NUMBERS TO 1000

1. The number 6 means 6 *ones* or 6 *units*. How many units are there in 7? in 10? How many units make 1 ten?

2. The number 30 means 3 tens. How many tens are there in 20? in 50? in 100?

3 tens = 30

3. 200 means 2 hundred. 600 means 6 hundred.
300 means 3 hundred. 900 means 9 hundred.

What does 400 mean? 500? 700? 800?

4. We write 10 hundreds thus: 1000. We read 1000 *one thousand*. What does 2000 mean?

5. Memorize these:

10 units = 1 ten, or 10
10 tens = 1 hundred, or 100
10 hundreds = 1 thousand, or 1000

6. The number 435 means 4 hundreds, 3 tens, and 5 units. We read it *four hundred thirty-five*.

7. The number 608 means 6 hundreds, no tens, and 8 units.

Remember that *zero* means *not any* or *nothing*.

USING HUNDREDS

1. Alice lives at 724 Maple Street. Say *seven hundred twenty-four* (not *seven hundred and twenty-four*).

2. There are 540 children in our school and 608 children in the Park School. 540 is read *five hundred forty.* 608 is read *six hundred eight.*

3. *Read these sentences:*

Pauline lives at 680 Adams Street.
There are 115 pages in Howard's new book.
Amy's class is in Room 109.

4. *Read these numbers:*

296	789	556	938	851	217
483	875	439	127	648	368

5. *Write these numbers in figures:*

Eight hundred five	Five hundred six
Nine hundred sixty-five	Nine hundred eighteen
Four hundred twenty-nine	Two hundred thirty-six

6. Anna's brother was born in 1921. The year 1921 could be read *one thousand nine hundred twenty-one* or *nineteen hundred twenty-one.* It is simpler to read such a number *nineteen twenty-one.* Give three ways of reading the year 1924.

7. Read: Edwin was born in 1918. His aunt was born in 1898.

DOLLARS AND CENTS

When we write dollars and cents, we write the sign \$ before the dollars and separate the dollars from the cents by a period. This period is called a **decimal point.**

3 dollars and 25 cents is written \$3.25.

2 dollars and 8 cents is written \$2.08.

5 dollars and no cents is written \$5.00 or \$5.

We have learned that 86 cents is written 86¢. It is also written \$0.86 or \$.86.

5 cents is written 5¢ or \$0.05 or \$.05.

Exercises

1. Edward saw these prices in a toy shop. Read each of them:

Doll, \$.59	Coaster, \$3.00	Bank, \$1.35
Baseball, \$.65	Meccano, \$3.75	Train, \$3.05
Teddy bear, \$.75	Auto, \$10.50	Skates, \$4.95

2. Read these: \$0.07; 85¢; \$.01; \$0.76.

3. Write 12 cents in three different ways. Write 6 cents in three different ways.

4. Use the sign \$ and the decimal point to write these:

4 dollars and sixty-five cents
3 dollars and twelve cents
1 dollar and thirty-one cents
7 dollars and no cents

5. Give two other ways of writing \$0.07.

GETTING READY TO ADD COLUMNS OF FIGURES

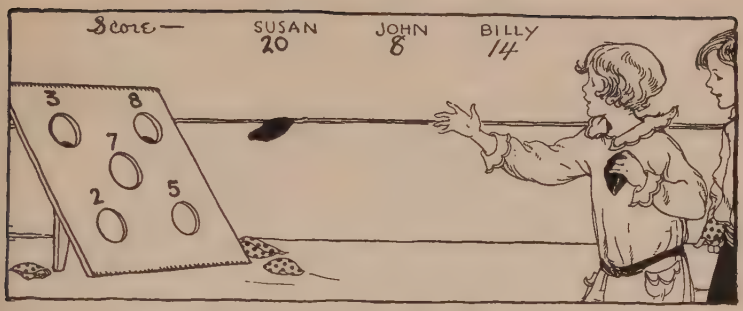
On page 33 you learned how to add numbers like 13 and 4. Now you will practice adding numbers like 18 and 3 in order to get ready to add columns of figures like those on the next page. In adding 18 and 3, try to think 21 at once. If you cannot do this, then start with 18 and count 3 more.

Study these sums. Then cover the answers with a card and try to give the sums correctly:

1.	5	15	25	35		9	19	29	39
	5	5	5	5		2	2	2	2
	10	20	30	40		11	21	31	41
2.	8	18	28	38		8	18	28	38
	2	2	2	2		3	3	3	3
	10	20	30	40		11	21	31	41

Give these sums orally as quickly as you can:

3.	9	19	29	39		9	19	39	29
	1	1	1	1		3	3	3	3
4.	8	18	28	38		7	17	37	27
	4	4	4	4		3	3	3	3
5.	9	19	39	29		9	29	19	39
	5	5	5	5		4	4	4	4
6.	10	30	20	40		6	26	16	36
	3	3	3	3		4	4	4	4



FINDING YOUR SCORE IN A GAME

Susan has 4 bean bags. She throws one into the hole marked 3; the second goes into hole 8, the third into 7, and the fourth into 2. Susan finds her score by writing the numbers as shown here. Then she adds up, thinking, "2, 9, 17, 20." She checks her answer by adding down, thinking, "3, 11, 18, 20." Susan's score is 20 because the sum is 20 each time.

3
8
7
2
20

Other children throw the bean bags into holes having these numbers. Find their scores.

1.	5	4	3	3	4	5	4	4
	8	8	7	9	7	8	7	9
	2	6	8	5	8	7	4	6
	5	4	3	4	4	5	5	5
2.	3	4	4	5	4	3	3	4
	9	4	2	3	3	2	2	3
	2	2	8	3	9	9	6	6
	6	6	4	4	3	4	9	5
	2	5	5	5	3	3	5	4

HARDER WORK IN ADDING BY ENDINGS

1. Begin with 18 and count 7 more. How many are 18 and 7?

$$\begin{array}{r} 18 \\ 7 \\ \hline 25 \end{array}$$

2. Begin with 28 and count 7 more. How many are 28 and 7?

3. Begin with 38 and count 7 more. How many are $38 + 7$? How many are $48 + 7$?

4. You can learn a much shorter way to get such sums by studying the following:

Since $8 + 7 = 15$, these sums all end in 5.

$$\begin{array}{r} 8 \\ 7 \\ \hline 15 \end{array} \qquad \begin{array}{r} 18 \\ 7 \\ \hline 25 \end{array} \qquad \begin{array}{r} 28 \\ 7 \\ \hline 35 \end{array} \qquad \begin{array}{r} 38 \\ 7 \\ \hline 45 \end{array} \qquad \begin{array}{r} 48 \\ 7 \\ \hline 55 \end{array}$$

The left-hand figure of each sum is 1 more than the figure above it, because $7 + 8$ are more than 10.

5. How many are 25 and 9? Find the sum the short way.

$$\begin{array}{r} 25 \\ 9 \\ \hline 34 \end{array}$$

Think: "The sum ends in 4 because $5 + 9 = 14$. The left-hand figure of the sum is 1 more than 2, which is 3. 34 is the sum."

Give the sums orally as quickly as you can:

6. $\begin{array}{r} 8 \\ 6 \\ \hline \end{array}$ $\begin{array}{r} 18 \\ 6 \\ \hline \end{array}$ $\begin{array}{r} 28 \\ 6 \\ \hline \end{array}$ $\begin{array}{r} 38 \\ 6 \\ \hline \end{array}$ $\begin{array}{r} 7 \\ 7 \\ \hline \end{array}$ $\begin{array}{r} 17 \\ 7 \\ \hline \end{array}$ $\begin{array}{r} 37 \\ 7 \\ \hline \end{array}$ $\begin{array}{r} 27 \\ 7 \\ \hline \end{array}$

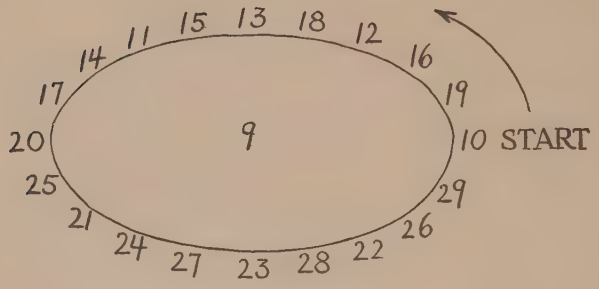
PRACTICE IN ADDING BY ENDINGS

Practice adding these numbers until you can give all the sums orally in 3 minutes:

Give only the answer. Thus, for 11 and 9 say only "20." You will need to use these new sums when you add long columns like those on page 49.

1.	11	21	17	27	12	22	16	26
	9	9	4	4	8	8	5	5
2.	16	26	19	29	17	27	15	25
	8	8	3	3	7	7	9	9
3.	13	23	16	26	19	29	14	24
	7	7	7	7	9	9	6	6
4.	19	29	13	23	17	27	12	22
	5	5	8	8	9	9	9	9
5.	15	25	17	27	19	39	16	36
	8	8	6	6	8	8	9	9
6.	17	47	14	24	18	38	19	49
	8	8	7	7	5	5	7	7
7.	18	28	19	39	18	38	18	58
	8	8	6	6	6	6	7	7

CAN YOU RACE AROUND THIS TRACK?



The number 10 on the track is the starting point, and the arrow shows in which direction you must run. Add the 9 in the middle to 10, then add 9 to 19, and so on. When you have added 9 to every number on the track, erase the 9 and put 8 in the middle in place of it. Then go around again, adding 8 to every number. Change 8 to 7 and go around again. Keep making the middle number smaller each time until you reach 1, when the race is finished. In all, you must go around the track 9 times.

The child who finishes the race in the shortest time wins. A mistake is a foul. If a child makes a foul, he cannot win the race.

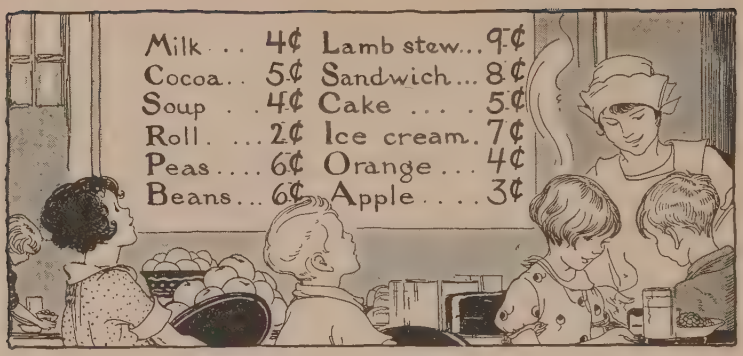
If you can go around the track 9 times in 7 minutes without making a mistake, you will find it easy to add columns like those on the next page.

ADDING COLUMNS OF FIGURES

Copy, and find the sums. Begin at the bottom of each column and add up. Check the answer by adding down:

In adding the first column, think, "3, 10, 14, 23."

1.	9	6	8	9	6	7	4	8
	4	5	4	5	4	7	6	0
	7	6	8	9	9	9	7	3
	3	7	8	7	9	6	9	9
2.	3	5	6	3	7	6	9	4
	4	8	9	4	8	4	1	5
	8	4	5	7	1	8	7	9
	9	9	7	6	4	7	4	9
3.	4	8	8	3	9	3	2	7
	9	0	5	8	5	7	6	6
	6	7	9	5	7	6	8	8
	9	4	3	9	7	5	5	6
4.	9	1	2	9	3	7	9	1
	0	4	4	0	7	3	4	9
	3	7	2	1	9	6	1	8
	5	3	9	2	5	2	2	1
	8	5	8	5	5	6	8	5
5.	6	2	8	5	4	6	8	6
	2	5	6	6	8	8	8	2
	5	9	8	5	6	0	2	9
	1	1	2	4	1	3	0	7
	8	6	2	8	2	9	7	6



BUYING LUNCH

1. Ruth bought a glass of milk, peas, a piece of cake, and an apple. How much did her lunch cost?

2. Henry had a cup of cocoa, a sandwich, and ice cream. How much did he have to pay?

3. David bought lamb stew, a roll, cake, and an orange. Find how much David's lunch cost.

4. Dora bought a cup of cocoa, beans, cake, and an apple. How much did her lunch cost?

5. Ella had soup, a sandwich, and ice cream. Find how much Ella's lunch cost.

6. Alfred had soup, a roll, peas, and an orange. How much did he spend for his lunch?

7. Make up four other lunches costing 17¢ each. Let each lunch have at least one thing from the first column of the menu and one thing from the second column.

8. Make up four lunches that cost 18¢ each.

LEARNING TO CARRY IN ADDITION

1. John sold 25 papers yesterday and 37 papers to-day. How many papers did he sell in both days?

You can add 25 and 37 in this way:

Write 37 under 25, and add upwards, like this:
Add 7 and 5, thinking "7, 12."
Write 2 under 7. Carry the 1 of 12 to the next column, and add it to 3, thinking "1, 4, 6." Write 6. The sum is 62.

```
 25
 37
---
 62 Sum
```

Hence John sold 62 papers.

Check your answer by adding down, thinking "5, 12." Write 2. Carry 1 and add it to 2, thinking "1, 3, 6."
Since you get 62 as the sum again, consider the work right.

2. Last week May earned 18¢ by helping mother, 25¢ by doing errands for Aunt Emma, and 47¢ by picking berries. How much did she earn in all?

You must add 18, 25, and 47.

Adding up, think "7, 12, 20." Write 0. Carry 2 to the next column and add it to 4, thinking "6, 8, 9." Write 9. The sum is 90.

```
 18
 25
 47
---
 90
```

Hence May earned 90¢ in all.

Check by adding down, thinking "8, 13, 20." Write 0. Carry 2 to the next column and add it to 1, thinking "3, 5, 9." The sum is 90 again, hence the work is right.

3. Alice read 26 pages of her book one morning and 39 pages in the afternoon. How many pages did she read that day?

4. Rob had 16¢. He earned 25¢ more yesterday and 15¢ to-day. How much has he now?

PRACTICE IN ADDING

Copy and add the following. Begin at the bottom in each example and add up. Check by adding down:

1. 48 35	2. 39 66	3. 75 46	4. 44 38	5. 76 96	6. 47 48
7. 28 39	8. 67 54	9. 67 93	10. 54 77	11. 34 59	12. 27 69
13. 69 13	14. 96 37	15. 67 27	16. 28 53	17. 92 69	18. 76 94
19. 29 49	20. 89 95	21. 99 84	22. 45 29	23. 88 37	24. 37 56
25. 85 96	26. 73 69	27. 59 77	28. 76 15	29. 56 28	30. 59 98
31. 56 49	32. 37 55	33. 48 38	34. 78 14	35. 88 36	36. 67 74
37. 43 26 14	38. 54 15 27	39. 46 52 99	40. 58 10 22	41. 73 47 98	42. 14 69 15
43. 39 46 68 59	44. 37 68 18 59	45. 35 16 29 14	46. 21 29 17 25	47. 15 16 37 14	48. 18 19 36 86

WHY GRACE HAD TROUBLE IN ADDING

Ted counted the stamps in his stamp book. He asked Grace to write down how many stamps he had on each page. There were 27 stamps on the first page, 8 stamps on the second page, 36 stamps on the third page, and 5 stamps on the fourth page. Grace wrote the numbers as shown at the right.

The Wrong Way

27
8
36
5

Grace could not add her numbers because the figures were not in columns. Ted put the units in one column and the tens in another, as shown at the right. Then the numbers could be added.

The Right Way

27
8
36
5
76

Adding the units, think "5, 11, 19, 26." Write 6 and carry 2. Then think "2, 5, 7." Write 7.

How many stamps did Ted have?

Exercises

Copy each problem. Then add and check:

1. 62	**2.** 46	**3.** 35	**4.** 12	**5.** 57
4	9	8	29	18
27	23	17	5	8
6. 27	**7.** 3	**8.** 46	**9.** 3	**10.** 23
8	15	2	69	6
34	9	25	16	28
3	26	7	4	7

JOHN HELPS IN THE STORE

PRICES FOR TO-DAY

Milk	13¢ a quart	Peaches	26¢ a can
Eggs	49¢ a dozen	Pears	25¢ a can
Butter	54¢ a pound	Pineapple	22¢ a can
Bread	7¢ a loaf	Raisins	17¢ a box
Crackers	6¢ a box	Corn	15¢ a can
Coffee	36¢ a pound	Squash	8¢ each
Cocoa	24¢ a can	Potatoes	28¢ for 10 pounds

Last Saturday John waited on customers in his father's store. Mrs. Jones bought a quart of milk, a pound of coffee, and a can of peaches.

CASH SALE

Clerk: John Date. Aug. 11

1	quart milk		13
1	pound coffee		36
1	can peaches		26
			75

John made out a *sales slip* like the one at the left, which he added up and gave to Mrs. Jones. "Cash Sale" means that the customer pays cash. On her way out Mrs. Jones paid the cashier 75¢.

JOHN MAKES OUT SALES SLIPS

John also made the sales given below. For each sale write a sales slip and add it to show what the customer must pay. Be sure to check by adding down. Why is it important to check the slips?

1. Mrs. Martin bought a quart of milk, a box of crackers, and a can of cocoa.

2. Miss Green bought a dozen eggs, a squash, and a box of raisins.

3. Mrs. Williams bought a pound of coffee, a loaf of bread, and a pound of butter.

4. Mrs. Lee bought a pound of butter, a box of crackers, and 10 pounds of potatoes.

5. Mrs. Ames bought a dozen eggs, a pound of coffee, and a squash.

6. Mr. Field bought a can of pears, a loaf of bread, a box of raisins, and a can of peaches.

7. Make up ten problems and find the amounts.

These sales were on other slips. Copy, add, and check:

8.	13	9.	17	10.	25	11.	17	12.	13	13.	7
	49		26		6		15		6		36
	6		8		26		8		54		24
14.	24	15.	6	16.	7	17.	26	18.	28	19.	8
	8		54		13		36		15		24
	22		15		22		7		25		49
	15		17		49		17		7		17

PROBLEMS

1. How many persons are there in a street car in which there are 38 men and 27 women?

2. Anna bought a school bag for 65¢ and a lunch box for 27¢. How much did she pay for both?

3. Bob had 45¢ and earned 36¢. How many cents did he then have?

4. Grace invited 25 girls to a picnic. Tom invited 36 boys. How many children were invited?

5. A street-car conductor collected 47 fares on one trip and 68 fares on another trip. How many fares did he collect on both trips?

6. Henry had 47 stamps. His uncle gave him 29 stamps more. How many stamps had he then?

7. For her party Minnie spent 65¢ for ice cream and 26¢ for cookies. How much did she spend in all?

8. Ida has washed 26 plates, 14 cups, and 14 saucers. How many dishes has she washed?

9. Ernest put 24¢ into his savings bank one week, 29¢ the next week, and 33¢ the third week. How much money had he in his bank then?

10. How much did it cost Lena to buy her sister a cap for 65¢, a rattle for 15¢, and a ball for 23¢?

Remember that 103¢ is the same as $1.03.

11. In her garden Laura found 28 dandelions, 27 daisies, and 24 red clovers. How many flowers did Laura find?

ADDING THREE-FIGURE NUMBERS

1. Carl went on a trip with his father. They drove 123 miles the first day and 149 miles the second day. How far did they go in the two days?

You must add 123 and 149.

Add the first column, thinking "9, 12." Write 2 and carry 1. Add the second column, thinking "1 (carried), 5, 7." Write 7. Then add the last column, thinking "1, 2," and write 2.

$$\begin{array}{r} 123 \\ 149 \\ \hline 272 \end{array}$$

The sum is 272. How many miles did Carl and his father go? Check by adding down.

In this problem you had to carry 1 from the units' column to the tens' column. In the next problem you have to carry 1 from the tens' column to the hundreds' column.

2. There are 275 boys and 382 girls in our school. How many pupils are there in our school?

Think "2, 7." Write 7. Think "8, 15." Write 5 and carry 1 to the next column. Then think "1 (carried), 4, 6." Write 6.

$$\begin{array}{r} 275 \\ 382 \\ \hline 657 \end{array}$$

There are 657 pupils in our school.

How can you check this problem? Check it.

Exercises

Copy the following and add. Check the work:

1.	2.	3.	4.	5.
245	263	177	491	126
346	674	519	387	456

MORE USES OF ADDITION

1. A gardener has 156 white roses and 137 red roses. How many roses has he?

2. A school bought 267 spellers and 326 readers. How many books did the school buy?

3. Father has 375 books in his library. He buys 142 more books. How many books has he then?

4. Amy was in school 183 days last year and 195 days this year. How many days was that in all?

Add without copying, writing only the answers on folded paper. Check each answer by adding down:

5. 614 278	10. 281 493	15. 745 162	20. 639 345	25. 429 252
6. 458 319	11. 544 262	16. 255 415	21. 268 327	26. 115 557
7. 349 231	12. 358 551	17. 236 548	22. 512 396	27. 471 377
8. 748 223	13. 327 467	18. 113 367	23. 258 236	28. 847 149
9. 163 546	14. 273 633	19. 691 176	24. 371 252	29. 671 266

NOTE. To add or subtract without copying, the pupil should place a sheet of paper with its edge under the first row of examples and write the answers on the paper. He should then fold the answers under, placing the folded edge under the second row, and so on.

HARDER WORK IN CARRYING

Paul had collected 485 stamps. He bought 239 more stamps. How many stamps had he then?

This is a harder problem than those which you have had, because to add these numbers you must carry twice. See how it is done.

Think "9, 14." Write 4 and carry 1. Think "1 (carried), 4, 12." Write 2 and carry 1. Think "1 (carried), 3, 7." Write 7.

$$\begin{array}{r} 485 \\ 239 \\ \hline 724 \end{array}$$

The sum is 724. Therefore Paul had 724 stamps.

How do you check your answer? Check it.

Exercises in Addition

1. Phil read 196 pages yesterday and 185 pages to-day. How many pages did he read in both days?

2. Roy picked 127 green apples and 198 red apples. How many apples did he pick in all?

Add without copying, and check your answers:

3. 275 366	7. 479 334	11. 189 355	15. 467 455	19. 432 269
4. 787 194	8. 189 147	12. 268 685	16. 379 269	20. 598 279
5. 395 145	9. 142 169	13. 279 356	17. 726 196	21. 438 279
6. 256 398	10. 357 259	14. 168 475	18. 717 193	22. 654 277

WATCHING ZEROS IN ADDITION

Sometimes John has trouble with the zeros in adding. A problem like this is hard for him:

Add 604 and 206.

Add the first column, thinking "6 + 4 = 10." Write 0 and carry 1. Add the next column, thinking "1 + 0 + 0 = 1." Write 1. There is nothing to carry. Then think "2 + 6 = 8." Write 8.

The sum is 810. Check the work.

```
 604
 206
 810
```

Practice with Zeros

Add without copying, and check your work:

1.	350 490	**8.**	197 608	**15.**	400 580	**22.**	886 64	**29.**	107 495
2.	650 200	**9.**	526 174	**16.**	203 237	**23.**	963 92	**30.**	300 470
3.	757 203	**10.**	992 67	**17.**	307 609	**24.**	72 758	**31.**	204 346
4.	505 405	**11.**	43 587	**18.**	986 18	**25.**	795 108	**32.**	107 803
5.	308 309	**12.**	11 493	**19.**	465 235	**26.**	160 676	**33.**	201 409
6.	124 406	**13.**	290 680	**20.**	208 494	**27.**	371 629	**34.**	608 303
7.	348 92	**14.**	509 205	**21.**	47 153	**28.**	24 378	**35.**	590 293

ADDING DOLLARS AND CENTS

Harold, Will, and Francis had been saving to buy a radio set. Harold had saved \$3.81, Will had saved \$5.06, and Francis had saved \$.75. Their father gave them \$1.50. How much had they all together?

Write the numbers so that the decimal points are in a straight line under one another. Write the sign \$ only before the first number.

Add the dollars and cents just like other numbers and place the decimal point in the sum under the other decimal points. Then check the work.

\$3.81
5.06
.75
1.50
\$11.12

You see that the children had \$11.12 for their radio set.

Practice in Adding Money

Copy these problems and add. Check your work:

1. \$2.54 5.77	2. \$3.28 6.88	3. \$4.98 2.37	4. \$2.87 .16
5. \$6.44 5.95 .66	6. \$8.19 .67 5.45	7. \$7.77 .05 1.69	8. \$6.43 3.97 .89
9. \$5.05 .64 2.98	10. \$3.97 4.25 .06	11. \$6.93 5.91 .12	12. \$3.93 .07 1.55
13. \$5.68 6.59 .10 7.46	14. \$8.04 .80 .28 3.63	15. \$1.60 9.96 .59 6.35	16. \$ .45 6.23 2.54 .19

BUYING CLOTHES

Frank is shopping with his mother. Find out how much they spend for each person.

1. For Frank they buy a pair of shoes at $4.85 and a gymnasium suit at $1.19.

2. For Joe, a cap at $1.17 and a sweater at $3.99.

3. For Ethel, a dress at $4.64 and a hat at $2.78.

4. For Lulu, a dress at $2.87 and a cape at $4.63.

5. For mother, a blouse at $4.76 and a hat at $9.75.

6. For father, slippers at $2.44, handkerchiefs at $2.86, and an umbrella at $2.67.

7. For Aunt Mary, a skirt at $5.74 and a blouse at $3.97.

8. For Uncle Ben, a necktie at $1.34 and a belt at $1.69.

9. For Cousin Arthur, a sweater at $2.95, knickers at $2.59, and a bathing suit at $1.23.

A SUBTRACTION RELAY RACE

The pupils are seated at their desks with the same number of players in each row. The teacher has a pack of papers like the one at the right. Each paper contains four subtraction problems. On the front desk of each row the teacher places, face down, as many slips of paper as there are players in the row.

17	14	13	16
9	5	8	7

When the teacher says "Start," the pupil in the front seat of each row picks up the top slip of paper, runs to the blackboard, and works his problems on the board. Then he runs back to his seat and lays the remaining slips on the desk behind him.

Then the second player in the row takes the top slip on his desk. He runs to the board with it and puts his problems and their answers on the board.

The game continues until all the players have put their problems on the board.

If a player makes a mistake, the next one in his row corrects it when his turn comes. The row that finishes first, with all its problems right, wins.

These problems are often missed. Try them.

1.	15	14	17	16	13	12	18	13
	8	9	8	7	6	5	9	9
2.	13	12	15	14	16	17	14	11
	4	3	6	6	9	9	5	2

NEW WORK IN SUBTRACTION

Fred wants to buy a baseball that costs 95¢. He has 27¢. How much more does he need?

What number must you add to 27 to make 95?

Since 5 is smaller than 7, you cannot add any number to 7 to make 5; but you can add a number to 7 to make 15. Hence think of 15 instead of 5. Then think "7 + **8** = 15." Write 8.

$$\begin{array}{r} 95 \\ 27 \\ \hline 68 \end{array}$$

Carry the 1 of 15 to the next column and add it to 2, which makes 3. Then think "3 + **6** = 9." Write 6.

Since 68 added to 27 makes 95, Fred needs 68¢ more.

To make sure that the work is right, check it by adding 68 and 27. This time begin at the bottom and add *up*, because you added *down* when you found 68. Think "8 + 7 = 15." Then think "1 (carried) + 6 + 2 = 9."

In the work above, you have *subtracted* 27 from 95. 68 is called the **difference** between 95 and 27.

Uses for Subtraction

1. A fishing rod costs 75¢. Jack has 36¢. How much more does he need to buy the rod?

2. Some boy scouts go 16 miles the first day of a 33-mile hike. How many miles have they still to go?

3. Henry bought a fishline that cost 81¢. He had only 58¢ with him, but he promised to pay the rest later. How much did he owe the storekeeper?

4. Alice ought to weigh 81 pounds. She weighs only 69 pounds. How much should she gain?

PRACTICE IN SUBTRACTING

Subtract without copying. Check the work:

1. 61	11. 70	21. 83	31. 93	41. 97	51. 52
42	13	24	29	48	18
2. 83	12. 70	22. 78	32. 91	42. 74	52. 85
57	21	59	67	39	48
3. 94	13. 50	23. 96	33. 82	43. 61	53. 46
56	35	77	13	35	18
4. 84	14. 71	24. 60	34. 71	44. 90	54. 52
67	46	19	23	38	24
5. 80	15. 91	25. 43	35. 32	45. 61	55. 83
37	14	25	17	48	26
6. 91	16. 62	26. 53	36. 84	46. 72	56. 74
49	16	18	45	35	18
7. 92	17. 35	27. 70	37. 95	47. 50	57. 82
19	16	42	67	34	56
8. 65	18. 87	28. 40	38. 84	48. 66	58. 75
29	19	16	65	39	26
9. 87	19. 40	29. 92	39. 76	49. 51	59. 93
38	24	55	57	22	27
10. 90	20. 72	30. 63	40. 54	50. 88	60. 45
47	26	27	36	29	38

SUBTRACTING THREE-FIGURE NUMBERS

1. Peter has an album that will hold 295 post cards. He now has 138 cards. How many more cards must he get to fill the album?

To subtract 138 from 295, find what number you must add to 138 to make 295.

Since 5 is less than 8, think of 15 instead of 5. Then think "8 + **7** = 15." Write 7. Carry the 1 of 15 and add it to 3, which makes 4. Think "4 + **5** = 9." Write 5. Then think "1 + **1** = 2." Write 1.

295
138
157

The difference is 157. How many more post cards must Peter get?

Check the answer by adding 157 and 138 upwards, thus: "7 + 8 = 15. 1 (carried) + 5 + 3 = 9. 1 + 1 = 2."

2. Otto was driving from the city of New York to Buffalo. He thought that the distance was 455 miles. When he looked it up he found that the distance was 393 miles. How far wrong was Otto?

Subtract 393 from 455.

Think "3 + **2** = 5." Write 2.
Then think "9 + **6** = 15." Write 6.
Carry the 1 of 15 to the next column and add it to 3, which makes 4. Think "4 + **0** = 4." You do not have to write the zero.

455
393
62

Otto had guessed 62 miles too much.

Check this answer.

3. Anna counted 276 boys and 184 girls in a parade. How many more boys than girls were there?

4. There are 365 days in a year. When 272 days have passed, how many days are left in the year?

PRACTICE IN SUBTRACTING

Subtract without copying, writing the answers on folded paper. Check the work by adding up:

1.	783 245	**9.**	717 265	**17.**	954 519	**25.**	928 664	**33.**	373 119
2.	501 61	**10.**	594 157	**18.**	491 379	**26.**	452 291	**34.**	689 396
3.	874 125	**11.**	781 37	**19.**	690 573	**27.**	772 633	**35.**	569 287
4.	261 42	**12.**	771 144	**20.**	909 252	**28.**	470 131	**36.**	879 591
5.	909 641	**13.**	943 404	**21.**	637 165	**29.**	496 119	**37.**	764 236
6.	591 373	**14.**	929 583	**22.**	952 437	**30.**	427 152	**38.**	693 417
7.	670 22	**15.**	559 273	**23.**	866 317	**31.**	801 330	**39.**	374 258
8.	857 661	**16.**	272 119	**24.**	595 208	**32.**	637 484	**40.**	891 245

FREE TICKETS TO THE CIRCUS

Guess how much the fat man weighs. If you guess within 5 pounds of his real weight, you get a free ticket to the circus. If you guess within 10 pounds of his weight, you get tickets for half price; if you guess within 15 pounds, you get a free ticket to the side show.

Here are the guesses of some children in our town:

Philip, 680	*Kate*, 783	*Jessie*, 459
Isabel, 273	*Nancy*, 470	*Howard*, 392
Francis, 576	*Ralph*, 185	*Nellie*, 874
Lillian, 480	*Teddy*, 475	*Wilbur*, 471

1. The fat man weighs 468 pounds. Find the difference between each guess and his weight.
2. Which children get free tickets to the circus?
3. Which children get tickets at half price?
4. Who gets a free ticket to the side show?
5. Which children guessed too little? too much?
6. Which child made the worst guess?
7. Are you good at guessing? Fill a glass with beans and guess how many beans there are in it. Let your classmates guess too. Then count the beans and find the difference between each guess and the right number.

CARRYING TWICE IN SUBTRACTION

1. What is the difference between 546 and 168?

Think "8 + **8** = 16." Write 8.

Carry 1 and add it to 6, which makes 7. Think "7 + **7** = 14." Write 7.

Carry 1 and add it to 1, which makes 2. Think "2 + **3** = 5." Write 3.

You see that the difference is 378. Check the work.

546
168
378

2. Subtract 396 from 653.

Think "6 + **7** = 13." Write 7.

Carry 1 and add it to 9, which makes 10. Think "10 + **5** = 15." Write 5.

Carry 1 and add it to 3, which makes 4. Think "4 + **2** = 6." Write 2.

The difference is 257. Check the work.

653
396
257

Practice in Subtracting

Subtract. Check your answers by adding up:

1.	752 454	**5.**	820 393	**9.**	965 796	**13.**	741 172	**17.**	951 276
2.	334 88	**6.**	933 674	**10.**	820 551	**14.**	636 197	**18.**	501 118
3.	703 295	**7.**	713 359	**11.**	811 273	**15.**	933 65	**19.**	930 456
4.	852 463	**8.**	641 484	**12.**	691 97	**16.**	787 698	**20.**	475 197

WATCHING ZEROS IN SUBTRACTION

1. Find the difference between 576 and 900.

Think "6 + **4** = 10." Write 4.
Carry 1 and add it to 7, which makes 8. Think "8 + **2** = 10." Write 2.
Carry 1 and add it to 5, which makes 6. Think "6 + **3** = 9." Write 3.
The difference is 324. How do you check the work?

900	
576	
324	

2. Subtract 509 from 716.

Think "9 + **7** = 16." Write 7.
Carry 1 and add it to 0, which makes 1. Think "1 + **0** = 1." Write 0.
Think "5 + **2** = 7." Write 2.
The difference is 207. Check the work.

716	
509	
207	

Practice with Zeros

Subtract without copying, and check the work:

1.	916 309	**6.**	412 206	**11.**	714 505	**16.**	617 308	**21.**	514 307
2.	806 642	**7.**	904 484	**12.**	907 73	**17.**	402 82	**22.**	755 80
3.	330 146	**8.**	640 83	**13.**	180 91	**18.**	920 745	**23.**	350 62
4.	908 269	**9.**	501 27	**14.**	802 99	**19.**	161 98	**24.**	603 495
5.	600 172	**10.**	200 99	**15.**	100 57	**20.**	800 206	**25.**	500 351

SAVING MONEY FOR CHRISTMAS

1. Hilda is saving to buy her sister a doll for Christmas. She has saved \$1.49. The doll costs \$3.75. How much more must she save?

Write the numbers so that the decimal points are directly under each other.

Subtract dollars and cents just as you subtract any other numbers. Place the decimal point in the answer under the other decimal points.

$$\begin{array}{r} \$3.75 \\ 1.49 \\ \hline \$2.26 \end{array}$$

You see that Hilda must save \$2.26 more.

Check the work to make sure that the answer is right.

2. Ed wants to buy Ned a meccano set costing \$4.65. He has \$2.48. How much more does he need?

3. Laura wants to buy Louise a tea set for \$4.98. She now has \$2.37. How much more money does Laura need?

4. George is earning money to buy a pair of roller skates. The skates cost \$3.49. George now has \$2.65. How much more does he have to earn?

5. Tom has saved \$5.00. He buys a pair of skates for \$3.86. How much money has he left?

6. Louis can buy a gray sweater for \$8.45 or a brown one for \$5.98. How much less does the brown sweater cost than the gray one?

MULTIPLYING 2's

1. Fred is selling pencils at 2¢ each. How much will Fred charge for 2 pencils? How many are two 2's? How many are 2 times 2?

$$\begin{array}{r} 2 \\ \times\ 2 \\ \hline 4 \end{array}$$

2. How much will Fred charge for 3 pencils? He adds three 2's and finds that 3 pencils will cost 6¢.

$$\begin{array}{r} 2 \\ 2 \\ \times\ 2 \\ \hline 6 \end{array}$$

To save time later on, Fred tries always to remember that three 2's are 6. How many are 3 times 2?

3. How much will Fred charge for 4 pencils? Fred adds four 2's to find out. How many are four 2's? How many are four times 2?

4. A short way to write "four 2's are 8" is like this:

$4 \times 2 = 8$ The sign $\times$ means *times*.

We read this "4 *times* 2 *are* 8."

5. Add these columns to tell how much Fred charges for 5 pencils; for 6 pencils. How many are five 2's? How many are 5×2? How many are six 2's? How many are 6×2?

$$\begin{array}{r} 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ \hline \end{array} \qquad \begin{array}{r} 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ \hline \end{array}$$

6. Remember this table so that you will not have to add the 2's the next time. This is called the multiplication table of 2's.

$1 \times 2 = 2$	$6 \times 2 = 12$
$2 \times 2 = 4$	$7 \times 2 = 14$
$3 \times 2 = 6$	$8 \times 2 = 16$
$4 \times 2 = 8$	$9 \times 2 = 18$
$5 \times 2 = 10$	$10 \times 2 = 20$

MULTIPLYING BY 2

1. Add these columns. How many are two 3's? How many are 2×3? How many are two 4's? $2 \times 4 = ?$ How many are 2×5? How many are 2×6?

3	4	5	6
3	4	5	6
6	8	10	12

2. Learn the table of 2's a new way, as shown here:

$2 \times 1 = 2$	$2 \times 5 = 10$	$2 \times 9 = 18$
$2 \times 2 = 4$	$2 \times 6 = 12$	$2 \times 10 = 20$
$2 \times 3 = 6$	$2 \times 7 = 14$	$2 \times 0 = 0$
$2 \times 4 = 8$	$2 \times 8 = 16$	$0 \times 2 = 0$

3. In the table above, you see that $2 \times 5 = 10$. On page 72 you learned that $5 \times 2 = 10$. Hence

2×5 is the same as 5×2.

4. Look in both tables and show that these are true:

$2 \times 4 = 4 \times 2$ $\quad$ $2 \times 7 = 7 \times 2$ $\quad$ $2 \times 9 = 9 \times 2$

5. How many are 2×6? How many are 6×2?

6. When you know that $8 \times 2 = 16$, you can always *make the first two numbers change places* and get $2 \times 8 = 16$.

7. *What numbers should be put where the dots are?*

$5 \times 2 = 2 \times \ldots$ $\quad$ $3 \times 2 = 2 \times \ldots$ $\quad$ $2 \times 6 = 6 \times \ldots$

$8 \times 2 = 2 \times \ldots$ $\quad$ $2 \times 1 = 1 \times \ldots$ $\quad$ $9 \times 2 = 2 \times \ldots$

USING MULTIPLICATION

1. Lucy is mailing 7 invitations to her party and she needs a 2-cent stamp for each. The stamps cost $7 \times 2¢$. How many cents is that?

2. How much must Margaret pay for six 2-cent stamps? for four 2-cent stamps?

3. How much will 2 dolls cost at 5¢ each?

4. You can write $2 \times 5 = 10$ in another way, as shown at the right.

$$\begin{array}{r} 5 \\ 2 \\ \hline 10 \end{array}$$

5. *Multiply the following:*

2	2	7	2	2	8	6	9	2
4	1	2	5	2	2	2	2	3
0	2	2	3	1	4	2	2	2
2	7	8	2	2	2	6	0	9

6. How much do 8 marbles cost at 2¢ each?

7. At 2¢ each, find the cost of:

5 stamps	9 whistles	7 post cards
10 apples	4 newspapers	2 jackstones

8. Find the cost of:

2 pears at 4¢ each.	2 buns at 2¢ each.
2 rulers at 9¢ each.	2 fans at 8¢ each.
2 bananas at 3¢ each.	2 pencils at 5¢ each.

9. How many 2's make 10? How many 2-cent stamps can you buy for 10¢?

10. How many 5-cent cakes can you buy for 10¢?

DIVIDING BY 2

1. Kate is buying crayons that cost 2¢ each. She has 8¢. How many crayons can Kate buy? How many 2's are there in 8?

2. Mary says that she remembers that there are four 2's in 8 because $4 \times 2 = 8$. Is she right?

3. You know that $6 \times 2 = 12$. This tells you that there are how many 2's in 12?

4. How many 2's are there in 14? in 16? in 18?

5. Another way of saying that there are four 2's in 8 is "8 divided by 2 equals 4." We write it like this: $8 \div 2 = 4$. The sign $\div$ means *divided by*.

6. Memorize the division table of 2's given at the right.

$2 \div 2 = 1$	$12 \div 2 = 6$
$4 \div 2 = 2$	$14 \div 2 = 7$
$6 \div 2 = 3$	$16 \div 2 = 8$
$8 \div 2 = 4$	$18 \div 2 = 9$
$10 \div 2 = 5$	$20 \div 2 = 10$

7. We can also write $12 \div 2 = 6$ like this: $2\overline{)12}$ $\quad 6$

8. *Divide these:*

$2\overline{)14}$ $2\overline{)2}$ $2\overline{)8}$ $2\overline{)6}$ $2\overline{)10}$ $2\overline{)18}$ $2\overline{)20}$ $2\overline{)16}$ $2\overline{)4}$

9. When boys are marching by 2's, how many rows do 12 boys make? 16 boys? 20 boys?

10. Roy is dividing 14¢ equally among some boys. If he gives each boy 2¢, how many boys are there?

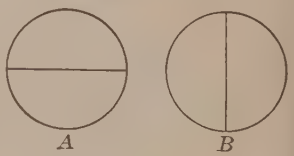
LEARNING ABOUT $\frac{1}{2}$

1. Mary has an apple. She cuts the apple into 2 equal pieces. Each piece is *one half* of the apple. One half is written $\frac{1}{2}$.

2. Here we have a stick of candy. Below it is the stick of candy divided into halves. Are both halves the same size?

3. Hilda bought a half pound of butter this morning and another half pound this afternoon. How much butter did she buy to-day?

4. The teacher asked Ada to draw a line to divide this circle into halves. This is the way Ada did it. Did she do it right?



5. Alice divided a circle into halves as shown at *A*. John divided it as shown at *B*. Did both Alice and John do it right?

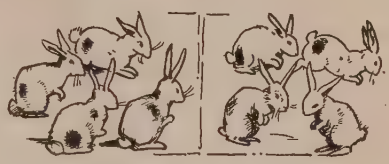
6. The teacher will draw circles on the board. Try to divide each circle into halves in a different way.

Both halves of anything must always be the same size.

7. Show how to divide a sheet of paper into halves and how to divide a piece of cord into halves.

FINDING ONE HALF OF A NUMBER OF THINGS

1. Helen has 8 bunnies. She divides them into 2 equal groups. How many bunnies are there in each group?



2. When Helen divides her 8 bunnies into 2 equal groups, each group contains *one half*, or $\frac{1}{2}$, of 8 bunnies. You see that $\frac{1}{2}$ of 8 bunnies is 4 bunnies.

3. Another way of writing "$\frac{1}{2}$ of 8" is "$8 \div 2$." Here $8 \div 2$ means that 8 has been divided into 2 equal parts. What is $8 \div 2$?

4. Here are 12 cents divided into 2 equal piles. Count the cents in each pile. How many are $\frac{1}{2}$ of 12¢? Now divide 12¢ by 2. Do you get the same answer as before? Is $\frac{1}{2}$ of 12 the same as $12 \div 2$?

To find $\frac{1}{2}$ of a number, divide it by 2.

5. *Find the following:*

$\frac{1}{2}$ of 2	$\frac{1}{2}$ of 6	$\frac{1}{2}$ of 16	$\frac{1}{2}$ of 10
$\frac{1}{2}$ of 4	$\frac{1}{2}$ of 14	$\frac{1}{2}$ of 18	$\frac{1}{2}$ of 20

6. *Tell what numbers should be put in the spaces:*

$\frac{1}{2}$ of 10 is the same as $10 \div (\ \ )$
$\frac{1}{2}$ of 16 is the same as $16 \div (\ \ )$

7. Find $\frac{1}{2}$ of 20 books; of 8 birds; of 14¢; of $18.

USING 2's IN PROBLEMS

Before working each problem, tell whether you must multiply or divide to find the answer.

1. Adele buys 6 post cards at 2¢ each. How much must she pay for them?

2. How many pencils costing 2¢ each can Dorothy buy for 10¢?

3. There are 18 children in Miss Caldwell's class. If they are divided into 2 equal teams, how many children will there be on each team?

4. George ran 2 errands to-day and received 10¢ for each errand. How much did George earn to-day?

5. Mr. Moore divides 12¢ equally between his 2 children. How much does each child get?

6. Tillie wants to buy a picture book that costs 16¢. If she saves 2¢ a day, how many days will it take her to save 16¢?

7. Last week Harry spent 2¢ for candy every day. How much did he spend for candy in 7 days?

8. During the summer Robert goes to a children's camp which charges $2 a day. How much does it cost if Robert stays 6 days? if he stays 8 days?

Tell what numbers should be put in place of the dots:

9.	$4 \times 2 = \ldots$	$8 \times 2 = \ldots$	$8 \div 2 = \ldots$
10.	$2 \times 9 = \ldots$	$3 \times 2 = \ldots$	$2 \div 2 = \ldots$
11.	$2 \times 2 = \ldots$	$0 \times 2 = \ldots$	$14 \div 2 = \ldots$

HOW TO MULTIPLY LARGER NUMBERS

Jack bought 2 knives at 34¢ each. How much did he pay for both?

You could find the cost of the knives by adding two 34's, as shown at the right:

$$\begin{array}{r} 34 \\ 34 \\ \hline 68 \end{array}$$

A shorter way to do it is to multiply 34 by 2, as explained below:

Think "2 × 4 = 8." Write 8 under 2.
Think "2 × 3 = 6." Write 6 under 3.
You see that the knives cost 68¢.

$$\begin{array}{rl} 34 & \text{Multiplicand} \\ 2 & \text{Multiplier} \\ \hline 68 & \text{Product} \end{array}$$

To check, go carefully over the work again and see if you still get the same answer. If you do, you may consider the work right.

In the work above, 34 is called the **multiplicand**, 2 is called the **multiplier**, and 68, the **product**.

Practice in Multiplying

Multiply the following. Check the work by going over it again to make sure that the answer is right:

1.	32 × 2	5.	33 × 2	9.	43 × 2	13.	20 × 2	17.	341 × 2
2.	21 × 2	6.	40 × 2	10.	72 × 2	14.	94 × 2	18.	124 × 2
3.	54 × 2	7.	63 × 2	11.	84 × 2	15.	50 × 2	19.	433 × 2
4.	92 × 2	8.	81 × 2	12.	91 × 2	16.	42 × 2	20.	230 × 2

USING MULTIPLICATION

1. Norman bought 2 toy boats. They cost 21¢ each. How much did he pay for both boats?

2. Lewis saved 42¢ this week. Jack saved twice as much as Lewis. How much did Jack save?

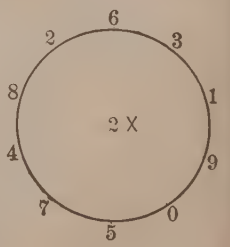
3. Bert's parents are moving into a new house. They buy 2 rugs for $33 each. How much do they pay for the rugs?

4. There are 12 eggs in 1 dozen. How many eggs are there in 2 dozen?

5. Tom and Harry visited their Aunt Martha. It cost 72¢ for each to go to her home by train. How much did it cost for both?

Remember that 144¢ is the same as $1.44.

6. Here is a game called "Add the Number You Have in Mind." Think of the number 1 and carry it in mind. Begin at any number on the circle, multiply it by 2, and then add the 1 that you are thinking of, like this: $2 \times 6 = 12$, $12 + 1 = 13$. Give only the answer, 13.



7. Play the game again. This time multiply each number by 2 and add 2 to the product.

HOW TO CARRY IN MULTIPLICATION

Alice bought 2 flags at 39¢ each. How much did she pay for both of them?

A short way to find out is to multiply 39 by 2.

Think "2 × 9 = 18." Write 8 and remember the 1, which you will carry in a moment.

Then think "2 × 3 = 6." Add 6 and the 1 that you are carrying, which makes 7. Write 7.

Alice paid 78¢ for both flags.

To check the work, go over it again.

$$\begin{array}{r} 39 \\ \times\ 2 \\ \hline 78 \end{array}$$

Practice in Multiplying

Multiply. Check the work by going over it again:

1. 27 × 2	7. 46 × 2	13. 59 × 2	19. 87 × 2	25. 135 × 2	31. 237 × 2
2. 79 × 2	8. 65 × 2	14. 29 × 2	20. 56 × 2	26. 439 × 2	32. 226 × 2
3. 68 × 2	9. 49 × 2	15. 85 × 2	21. 37 × 2	27. 419 × 2	33. 238 × 2
4. 25 × 2	10. 77 × 2	16. 89 × 2	22. 95 × 2	28. 415 × 2	34. 346 × 2
5. 18 × 2	11. 47 × 2	17. 26 × 2	23. 96 × 2	29. 416 × 2	35. 128 × 2
6. 38 × 2	12. 17 × 2	18. 57 × 2	24. 78 × 2	30. 319 × 2	36. 147 × 2

THE SCOUTS GET READY FOR A HIKE

1. Two Boy Scouts bought these things for a hike up Eagle Mountain:

2 knapsacks at 67¢ each
2 knives at 50¢ each
2 belts at 48¢ each
2 ropes at 26¢ each

How much did the boys pay for knapsacks? How many cents did they pay for knives? how many dollars?

2. How much did they pay for belts? for ropes? How much did all the things together cost?

Using Zeros in Multiplication

George and his father drove 109 miles to Aunt Anna's. They drove back the next day. How many miles did they drive in all?

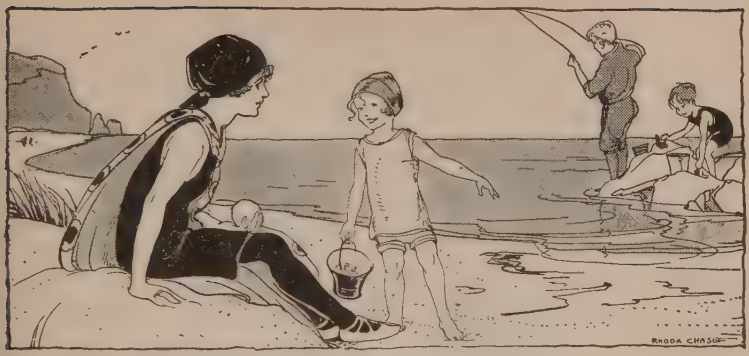
Multiply 109 by 2 in this way:

Think "2 × 9 = 18." Write 8 and remember the 1 to be carried.
Think "2 × 0 = 0. 0 + 1 (carried) = 1." Write 1.
Think "2 × 1 = 2." Write 2.
They drove 218 miles in all. Check by going over the work.

$$\begin{array}{r} 109 \\ \times\ 2 \\ \hline 218 \end{array}$$

Multiply. Check the work by going over it again:

1. 140 × 2	**3.** 400 × 2	**5.** 303 × 2	**7.** 404 × 2	**9.** 200 × 2
2. 205 × 2	**4.** 107 × 2	**6.** 308 × 2	**8.** 307 × 2	**10.** 206 × 2



A DAY AT THE SEASHORE

1. Father and mother drove Bob and Clara to the seashore, which is 56 miles from their house. How many miles did they drive going there and back?

2. They rented bathing suits. Bob's and Clara's each cost 35¢. How much did both cost?

3. Mother and father had to pay 45¢ each for their suits. How much did their suits cost?

4. Clara swam 17 strokes without stopping. Bob swam twice that number of strokes. How many strokes did Bob swim?

5. Bob brought home 16 crabs. Clara brought twice as many shells. How many shells had Clara?

6. Clara was pacing off 100 feet on the sand. Her steps are 2 feet long. She counted her steps by 2's until she got to 100. Count by 2's as Clara did.

7. Mother threw the ball 19 feet. Clara threw it twice as far. How far did Clara throw it?

MULTIPLYING 3's

1. Count by 3's to 30, beginning 3, 6, 9.

2. Add these columns. How many are three 3's? four 3's? five 3's? six 3's?

3. Show by adding how many seven 3's make; eight 3's; nine 3's; ten 3's.

			3
		3	3
	3	3	3
3	3	3	3
3	3	3	3
3	3	3	3
9	12	15	18

4. Remember this table:

$1 \times 3 = 3$	$5 \times 3 = 15$	$9 \times 3 = 27$
$2 \times 3 = 6$	$6 \times 3 = 18$	$10 \times 3 = 30$
$3 \times 3 = 9$	$7 \times 3 = 21$	$0 \times 3 = 0$
$4 \times 3 = 12$	$8 \times 3 = 24$	$3 \times 0 = 0$

5. *Multiply the upper number by the lower one:*

3	3	3	3	3	3	3	3	3
7	4	1	3	8	5	2	6	9

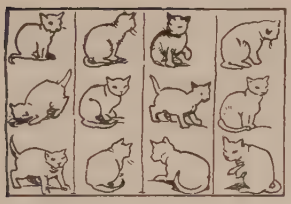
6. At 3¢ apiece, find the cost of:

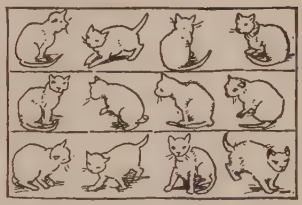
3 tops	7 plums	5 erasers
8 balls	4 dolls	6 pencils
9 cakes	10 pears	2 oranges

7. Helen saved 3¢ each day for 5 days. How much did she save in all?

8. John's chickens eat 3 quarts of corn in 1 day. How many quarts will they eat in 7 days?

MULTIPLYING BY 3





1. How many are 4×3 cats? How many are 3×4 cats?

4×3 is the same as 3×4.

$$\begin{array}{r} 3 \\ 4 \\ \hline 12 \end{array} \qquad \begin{array}{r} 4 \\ 3 \\ \hline 12 \end{array}$$

If you change the places of two numbers that are multiplied, you still get the same product.

2. Since $9 \times 3 = 27$, what does 3×9 equal?

Tell what numbers should be put in the spaces:

3. $2 \times 3 = (\ ) \times 2 \quad 8 \times 3 = 3 \times (\ ) \quad 9 \times 3 = 3 \times (\ )$

4. $6 \times 3 = (\ ) \times 6 \quad 1 \times 3 = 3 \times (\ ) \quad 10 \times 3 = (\ ) \times 10$

5. You can also write the table of 3's like this:

$3 \times 1 = 3$	$3 \times 4 = 12$	$3 \times 7 = 21$
$3 \times 2 = 6$	$3 \times 5 = 15$	$3 \times 8 = 24$
$3 \times 3 = 9$	$3 \times 6 = 18$	$3 \times 9 = 27$

Multiply the upper number by the lower one:

6.

3	10	3	3	7	4	1	0	3	9
9	3	2	8	3	3	3	3	3	3

7.

3	3	6	3	2	5	3	3	8	3
5	7	3	0	3	3	6	1	3	4

USING 3's

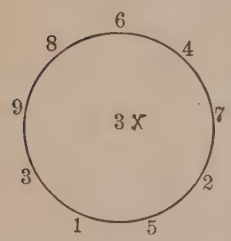
1. It takes Ella 9 minutes to make one rosebud for her new hat. It takes 3 times as long to make 3 rosebuds. How long will it take Ella to make 3 rosebuds?

2. Find the cost of:

3 balls at 6¢ each	3 pencils at 7¢ each
3 pads at 10¢ each	3 apples at 5¢ each
3 oranges at 4¢ each	3 games at 8¢ each
3 cookies at 3¢ each	3 notebooks at 9¢ each

3. When Edna was on a vacation, she wrote 6 letters and 3 times as many post cards. How many post cards did she write?

4. At 3¢ each, how much do 7 stamps cost?



5. Play this game. Point to each number on the circle and multiply it by 3. Then multiply 3 by each number on the circle.

6. Play the entire game again. Each time that you multiply, add the number 2 to the product, like this: $3 \times 6 = 18$ and $18 + 2 = 20$. Say only "20."

Tell what numbers should be put where the dots are:

7.	$18 = \ldots$ 3's	$9 \times \ldots = 27$	$\ldots \times 3 = 3$
8.	$15 = \ldots$ 3's	$3 \times \ldots = 24$	$\ldots \times 5 = 15$
9.	$12 = \ldots$ 3's	$3 \times \ldots = 6$	$\ldots \times 3 = 27$
10.	$21 = \ldots$ 3's	$3 \times \ldots = 0$	$\ldots \times 8 = 24$

DIVIDING BY 3

1. Mary has a doll's house. She can buy chairs for it at 3¢ each. How many chairs can Mary buy for 12¢? How many 3's are there in 12?

2. How many 3's are there in 15? How many 3-cent chairs could Mary buy for 15¢?

3. John says that his multiplication table tells him how he can make a division table. He knows that $6 \times 3 = 18$. This tells him that 18 contains six 3's. John therefore knows that $18 \div 3 = 6$.

4. Ruth remembers that $4 \times 3 = 12$. This tells her that 12 contains four 3's. Hence $12 \div 3 = ?$

5. Make a division table of 3's, from your multiplication table. Compare it with the one below:

$3 \div 3 = 1$	$18 \div 3 = 6$
$6 \div 3 = 2$	$21 \div 3 = 7$
$9 \div 3 = 3$	$24 \div 3 = 8$
$12 \div 3 = 4$	$27 \div 3 = 9$
$15 \div 3 = 5$	$30 \div 3 = 10$

6. *Divide:*

3)21 3)3 3)24 3)6 3)15 3)18 3)9 3)30 3)27

7. It costs 3¢ to ride on the merry-go-round. How many times can Henry ride for 15¢?

8. Minnie wants a game that costs 24¢. If she saves 3¢ a day, in how many days can she buy it?

LEARNING ABOUT $\frac{1}{3}$

1. Frank has a melon. He divides it into 3 equal parts, as shown at the left.

When *one thing*, like a melon, is divided into 3 equal parts, each part is called *one third* of the whole. One third is written $\frac{1}{3}$.

2. Elizabeth has 12 little chicks. She divides them into 3 equal groups. When a *group of things*, like 12 chicks, is divided into 3 equal parts, each part is called *one third*, or $\frac{1}{3}$, of the whole number.

3. Count how many chicks Elizabeth has in each group. How many are $\frac{1}{3}$ of 12 chicks?

4. Divide 12 by 3. Do you get the same answer as in ex. 3? Is $\frac{1}{3}$ of 12 the same as $12 \div 3$?

Here $12 \div 3$ means 12 divided into 3 equal parts.

To find $\frac{1}{3}$ of a number, divide it by 3.

5. Ida divides 18 marbles equally among 3 boys. How many marbles does each boy get?

Find the following:

6. $\frac{1}{3}$ of 6 $\frac{1}{3}$ of 24 $\frac{1}{3}$ of 3 $\frac{1}{3}$ of 12

7. $\frac{1}{3}$ of 9 $\frac{1}{3}$ of 27 $\frac{1}{3}$ of 21 $\frac{1}{3}$ of 30

8. Find $\frac{1}{3}$ of 21 flags; of 15 pens; of 24 apples.

MULTIPLYING LARGER NUMBERS BY 3

1. Last week Joe worked 3 days at 42¢ a day. How much did he earn?

To find how much he earned, multiply 42 by 3.

Think "3 × 2 = 6." Write 6.
Think "3 × 4 = 12." Write 12.
The product is 126. Joe earned 126¢, or $1.26.

$$\begin{array}{r} 42 \\ \times\ 3 \\ \hline 126 \end{array}$$

2. Multiply 68 by 3.

In this multiplication, you have to carry.

Think "3 × 8 = 24." Write 4 and carry 2.
Think "3 × 6 = 18. 18 + 2 (carried) = 20."
Write 20. The product is 204.

$$\begin{array}{r} 68 \\ \times\ 3 \\ \hline 204 \end{array}$$

Check the work by going over it again.

Practice in Multiplying

1. At 53¢ each, how much do 3 balls cost?

2. There are 24 children in our kindergarten and 3 times that number in our first grade. How many children are there in our first grade?

Multiply. Check the work by going over it again:

3. 23 × 3	**6.** 36 × 3	**9.** 41 × 3	**12.** 17 × 3	**15.** 55 × 3	**18.** 60 × 3
4. 19 × 3	**7.** 45 × 3	**10.** 78 × 3	**13.** 62 × 3	**16.** 85 × 3	**19.** 37 × 3
5. 16 × 3	**8.** 98 × 3	**11.** 72 × 3	**14.** 44 × 3	**17.** 29 × 3	**20.** 67 × 3

CARRYING TWICE IN MULTIPLICATION

A moving picture is to be shown at our school at 3 different times. There is room for 235 pupils to see it each time. How many pupils in all can see the picture?

You must multiply 235 by 3. In this problem you must carry twice and must watch the 0's.

Think "$3 \times 5 = 15$." Write 5 and remember 1 to be carried.

Think "$3 \times 3 = 9$. $9 + 1$ (carried) $= 10$." Write 0 and remember 1 to be carried.

Think "$3 \times 2 = 6$. $6 + 1$ (carried) $= 7$." Write 7.

$$\begin{array}{r} 235 \\ \times\ 3 \\ \hline 705 \end{array}$$

The product is 705. Hence 705 pupils can see the picture.

How do you check the work to make sure that it is right?

Multiplying by 3

1. Bert delivered 139 papers on each of 3 days. How many papers did he deliver on those days?

2. Paul delivered 167 papers on each of 3 days. How many papers did he deliver on those days?

3. How many papers did both boys deliver?

4. Each block in our town is 275 feet long. Our house is 3 blocks away from grandmother's house. How far is it from our house to grandmother's?

5. There are 184 school days in a year at the Richardson School. Nathan attended this school for 3 years and was never absent. How many days in all did he go to this school?

PRACTICE IN MULTIPLYING BY 3

Multiply. Check the work by going over it again:

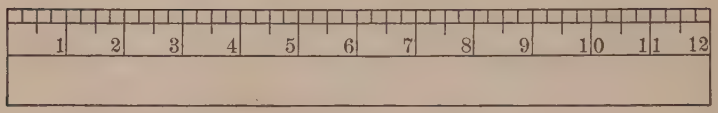
1. 249 × 3	**8.** 195 × 3	**15.** 236 × 3	**22.** 177 × 3	**29.** 258 × 3
2. 188 × 3	**9.** 296 × 3	**16.** 174 × 3	**23.** 255 × 3	**30.** 139 × 3
3. 148 × 3	**10.** 257 × 3	**17.** 268 × 3	**24.** 239 × 3	**31.** 165 × 3
4. 191 × 3	**11.** 283 × 3	**18.** 142 × 3	**25.** 263 × 3	**32.** 252 × 3
5. 309 × 3	**12.** 208 × 3	**19.** 304 × 3	**26.** 107 × 3	**33.** 206 × 3
6. 235 × 2	**13.** 146 × 2	**20.** 135 × 3	**27.** 279 × 2	**34.** 157 × 2
7. 248 × 2	**14.** 136 × 3	**21.** 309 × 2	**28.** 246 × 3	**35.** 167 × 3

36. In our school there are 137 vacation days each year. John went to school 3 years. How many vacation days did he have all together?

37. A freight boat travels 245 miles a day. How many miles will it go in a trip of 3 days?

38. John's father owns 3 stores. He gets $185 rent a month from each store. How much rent does he get in a month?

USING THE FOOT RULE



This is a picture of a foot rule; but it is much smaller than a real foot rule.

1. What do the numbers on the rule stand for?

A foot rule is 12 inches long.

2. Measure this line. How many inches long is it?

---

3. Draw a line 3 inches long; 5 inches long.

4. How many inches is it on your rule from the number 5 to the number 6? from 7 to 9?

5. Is this book 1 foot long or less than 1 foot long? How many inches long is it? How many inches wide is it?

6. How long is your pencil?

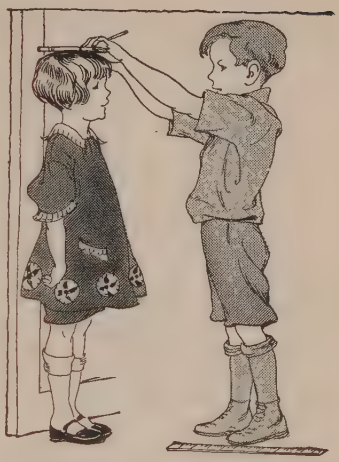
7. On the blackboard draw a line 1 foot 2 inches long; a line 2 feet 4 inches long.

8. How long is your desk? How wide is it?

9. Without using your rule, draw a line on the blackboard which you think is 2 feet long. Measure it with your rule to see how close you came. Is your line longer or shorter than 2 feet?

10. Measure the teacher's desk. How many feet and inches long is it? How wide is it?

HOW TALL ARE YOU?



1. Jerry makes a small mark on the wall to show Mary's height. Then he measures the distance from the floor to the mark with a foot rule. He finds that Mary is 3 feet 4 inches tall.

2. Jerry then measures Anna. She is 3 feet 6 inches tall. Who is taller, Mary or Anna? how much taller?

3. Measure each child in your class. Who is the tallest boy? the tallest girl? the shortest boy?

4. Place a small ball of cotton over a mark on the floor and kick the ball. Measure the distance you kick it. The child who kicks the ball farthest wins.

5. Ribbon and cloth are measured with a yardstick. Count the number of feet on a yardstick.

There are 3 feet in 1 yard.

6. How many inches are there in 1 foot? in 3 feet? Then how many inches are there in 1 yard?

7. How many yards long and wide is your classroom? the blackboard? the playground?

8. Play store, using string for ribbon. Sell 2 yards of ribbon to Ruth and 3 yards to Alice.

FEET AND INCHES

Inch and *inches* are sometimes written *in.*; *foot* and *feet* are written *ft.*; *yard* and *yards* are written *yd.*

1. Remember this table of *length:*

12 inches (in.)	= 1 foot (ft.)
3 feet (ft.)	= 1 yard (yd.)
36 inches (in.)	= 1 yard (yd.)

2. Since 1 yd. contains 3 ft., 2 yd. contain 2×3 ft., or 6 ft. How many feet are there in 3 yd.? in 4 yd.? in 6 yd.? in 8 yd.? in 10 yd.?

3. Guy wants 7 yd. of rope. The rope is sold by the foot. How many feet of rope should he ask for?

4. Dora measured her window with a foot rule and found that she needed 6 ft. of muslin for a curtain. Muslin is sold by the yard. Since 3 ft. are 1 yd., how many yards of muslin did Dora need?

5. How many yards are there in 12 ft.? in 18 ft.? in 21 ft.? in 27 ft.?

6. How many inches are there in 1 ft.? in 2 ft.? in 5 ft.? in 4 ft.? in 6 ft.?

7. How many inches are there in $\frac{1}{2}$ ft.? in $\frac{1}{3}$ ft.? How many feet are there in $\frac{1}{3}$ yd.? How many yards are there in $\frac{1}{3}$ of 18 yd.? in $\frac{1}{2}$ of 16 yd.?

8. Caroline has a piece of ribbon 1 ft. 4 in. long. How many inches long is it?

SHORT DIVISION

William collected 68¢ by selling papers at 2¢ each. How many papers did he sell?

Find how many 2's there are in 68 in this way:

Divisor 2)68 Dividend
34 Quotient

Think: "There are three 2's in 6." Write 3 under 6.
Think: "There are four 2's in 8." Write 4 under 8.
This shows that William sold 34 papers.
Check your work by multiplying 34 by 2. This gives 68; hence you know that the work is right.

Check

34
2
68

In the work above, 2 is the **divisor,** 68 is the **dividend,** and 34 is the **quotient.**

Practice in Division

1. Mr. and Mrs. Reed paid 86¢ for 2 railroad tickets. How much did each ticket cost?

2. Joe had 42 marbles and gave $\frac{1}{2}$ of them to Roy. How many marbles did Roy get?

Remember that $\frac{1}{2}$ of 42 means 2)42.

3. The hall of our home is 36 feet long. How many yards long is it?

Divide. Check your work by multiplying:

4. 2)82 **7.** 2)64 **10.** 2)48 **13.** 2)26 **16.** 2)88

5. 2)24 **8.** 2)84 **11.** 2)62 **14.** 3)96 **17.** 3)99

6. 3)39 **9.** 2)22 **12.** 2)28 **15.** 3)66 **18.** 3)69

19. Find: $\frac{1}{3}$ of 33; $\frac{1}{3}$ of 93; $\frac{1}{2}$ of 44; $\frac{1}{2}$ of 66.

HOW MANY ARE LEFT OVER?

1. Betty has 13¢. She buys six 2-cent stamps. How many cents has she left?

2. If 18 boys march by 2's, how many rows will there be? If 19 boys march by 2's, how many rows will there be and how many boys will be left over?

3. Mother gives Mary 20¢ to buy 6 oranges at 3¢ each. How much change does Mary get?

Tell what numbers should be put in place of the dots:

4. For 9¢ I got . . . 2-cent cards and had . . .¢ left.

5. For 7¢ I got . . . 3-cent cards and had . . .¢ left.

6. For 11¢ I got . . . 2-cent pens and had . . .¢ left.

7. For 11¢ I got . . . 3-cent pens and had . . .¢ left.

8. For 13¢ I got . . . 3-cent tops and had . . .¢ left.

9. For 15¢ I got . . . 2-cent tops and had . . .¢ left.

10. For 16¢ I got . . . 3-cent pens and had . . .¢ left.

11. For 10¢ I got . . . 3-cent pears and had . . .¢ left.

When the boys in our school are marching by 2's,

12. 17 boys make . . . rows with . . . boys over.

13. 20 boys make . . . rows with . . . boys over.

When the boys in our school march by 3's,

14. 17 boys make . . . rows with . . . boys over.

15. 23 boys make . . . rows with . . . boys over.

16. In 28 there are nine 3's and 1 is left over. This 1 is called the **remainder.**

SHARING EXPENSES

Three children bought their mother a present for 78¢. They shared the expense equally. How much did each child pay?

To find out, you must divide 78 by 3.

Think "7 ÷ 3 = 2, with 1 over." Write 2 under 7.

$$\begin{array}{r} 3\overline{)78} \\ \hline 26 \end{array}$$

Imagine the remainder, 1, written before the 8, making 18. Think "18 ÷ 3 = 6." Write 6 under 8.

The quotient is 26. Therefore each child's share was 26¢.

Check the work by multiplying 26 by 3.

Exercises

1. Green Lake is 34 miles wide. Fred's boat can cross the lake in 2 hours. How far can it go in 1 hour?

2. Uncle Ed divided 84 marbles equally among 3 boys. How many marbles did each boy get?

3. How many yards of bunting are needed for a side of our gymnasium, which is 87 ft. long?

Divide the following. Check the work by multiplying:

4. $2\overline{)72}$	**9.** $2\overline{)32}$	**14.** $2\overline{)92}$	**19.** $3\overline{)45}$	**24.** $3\overline{)48}$
5. $3\overline{)51}$	**10.** $2\overline{)78}$	**15.** $2\overline{)56}$	**20.** $2\overline{)98}$	**25.** $3\overline{)60}$
6. $3\overline{)42}$	**11.** $2\overline{)36}$	**16.** $3\overline{)54}$	**21.** $2\overline{)54}$	**26.** $2\overline{)38}$
7. $3\overline{)75}$	**12.** $2\overline{)76}$	**17.** $2\overline{)74}$	**22.** $2\overline{)90}$	**27.** $3\overline{)81}$
8. $3\overline{)57}$	**13.** $2\overline{)50}$	**18.** $3\overline{)72}$	**23.** $2\overline{)30}$	**28.** $2\overline{)96}$

HOW MANY STAMPS DOES EACH BOY GET?

1. Two boys divide 146 stamps equally between them. How many stamps does each boy get?

To find out, you must divide 146 by 2.

Since you cannot divide 1 by 2, you must divide 14 by 2. Think "$14 \div 2 = 7$." Write 7 under 4. Think "$6 \div 2 = 3$." Write 3 under 6.

$$2\overline{)146}\quad 73$$

Each boy gets 73 stamps. Check by multiplying.

2. Three boys divide 162 stamps equally among them. How many stamps does each boy get?

To find each boy's share, divide 162 by 3 thus:

Think "$16 \div 3 = 5$, with 1 over." Write 5 under 6. Imagine the remainder, 1, written before the 2, making 12. Think "$12 \div 3 = 4$." Write 4.

$$3\overline{)162}\quad 54$$

How many stamps does each boy get? Check by multiplying.

3. Bob has 118 stamps. He gives $\frac{1}{2}$ of them to Paul. How many stamps does Paul get?

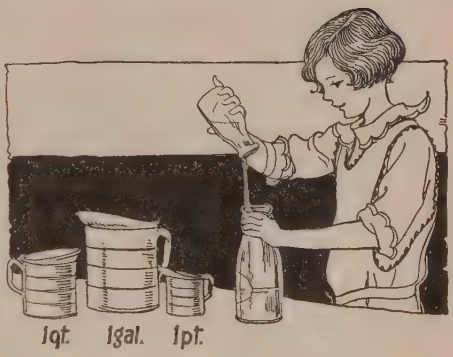
Divide. Check each problem by multiplying:

4. $2\overline{)142}$	**7.** $2\overline{)170}$	**10.** $3\overline{)252}$	**13.** $2\overline{)156}$
5. $3\overline{)216}$	**8.** $3\overline{)117}$	**11.** $2\overline{)136}$	**14.** $3\overline{)198}$
6. $3\overline{)195}$	**9.** $2\overline{)168}$	**12.** $3\overline{)291}$	**15.** $2\overline{)178}$

Find the following:

16. $\frac{1}{2}$ of 128	**18.** $\frac{1}{2}$ of 188	**20.** $\frac{1}{3}$ of 285
17. $\frac{1}{3}$ of 156	**19.** $\frac{1}{3}$ of 189	**21.** $\frac{1}{3}$ of 222

QUARTS AND PINTS



1. How much milk does your mother buy each day? What other liquids are sold by the pint or by the quart? by the gallon?

2. Fill a pint bottle with water and pour it into an empty quart bottle. Then pour another pint into the quart bottle. Does this fill the quart bottle? How many pints make a quart?

3. Pour a quart of water into an empty gallon can. Repeat until the can is filled. How many quarts equal 1 gallon?

4. Memorize this table of *liquid measure:*

2 pints (pt.) = 1 quart (qt.)
4 quarts (qt.) = 1 gallon (gal.)

5. If 4 glasses can be filled with 1 qt. of water, how many glassfuls make about 1 qt.? 1 pt.?

6. Every child should drink 1 qt. of milk every day. About how many glasses of milk is that? how many pints?

7. How many quarts are there in 1 gal.? in 2 gal.?

MULTIPLYING 4's

1. Count by 4's to 40.

2. Add these columns. How many are three 4's? four 4's? five 4's? six 4's?

3. By adding columns of 4's, find how many seven 4's are; eight 4's; nine 4's; ten 4's.

			4
		4	4
	4	4	4
4	4	4	4
4	4	4	4
4	4	4	4
12	16	20	24

4. Remember this table:

$1 \times 4 = 4$	$5 \times 4 = 20$	$9 \times 4 = 36$
$2 \times 4 = 8$	$6 \times 4 = 24$	$10 \times 4 = 40$
$3 \times 4 = 12$	$7 \times 4 = 28$	$0 \times 4 = 0$
$4 \times 4 = 16$	$8 \times 4 = 32$	$4 \times 0 = 0$

5. *Multiply the following:*

4	4	4	4	4	4	4	4	4
3	8	1	5	9	2	7	4	6

6. *What numbers should be put in place of the dots?*

1 gal. = 4 qt.	6 gal. = . . qt.	1 qt. = 4 glassfuls
7 gal. = . . qt.	9 gal. = . . qt.	2 qt. = . . glassfuls
5 gal. = . . qt.	3 gal. = . . qt.	4 qt. = . . glassfuls

7. Mary made 5 qt. of lemonade. How many glassfuls would 5 qt. make?

8. It cost Mary 4¢ a quart to make the lemonade. How much did the 5 qt. cost?

MULTIPLYING BY 4

1. Mary said, "I have learned that $6 \times 4 = 24$. If I change the first two numbers about, this tells me that $4 \times 6 = 24$." Was Mary right?

Tell what numbers should be put in the blank spaces:

2. I know that $7 \times 4 = 28$. Therefore $4 \times 7 = (\ )$.

3. I know that $5 \times 4 = 20$. Therefore $(\ ) \times 5 = 20$.

4. $8 \times 4 = (\ ) \times 8$ | $6 \times 4 = 4 \times (\ )$ | $2 \times 4 = 4 \times (\ )$

5. $5 \times 4 = (\ ) \times 5$ | $9 \times 4 = 4 \times (\ )$ | $7 \times 4 = 4 \times (\ )$

6. Write the 4's table in another way, beginning like this: $4 \times 1 = 4$, $4 \times 2 = 8$, $4 \times 3 = 12$.

7. *Multiply as rapidly as you can:*

4	10	4	4	7	4	9	4	1	0
9	4	7	4	4	0	4	3	4	4
4	3	4	4	6	8	4	2	4	5
8	4	2	1	4	4	5	4	6	4

8. Do ex. 7 again, adding 3 to each product.
Think "$9 \times 4 = 36$; $36 + 3 = 39$." Say only "39."

9. How much do 4 pads of paper cost at 7¢ each?

Tell what numbers should be put in place of the dots:

10. $20 = \ldots$ 4's $9 \times \ldots = 36$ $\ldots \times 4 = 16$

11. $36 = \ldots$ 4's $3 \times \ldots = 12$ $\ldots \times 6 = 24$

12. $16 = \ldots$ 4's $4 \times \ldots = 28$ $\ldots \times 2 = 8$

13. $24 = \ldots$ 4's $4 \times \ldots = 0$ $\ldots \times 3 = 12$

DIVIDING BY 4

1. How many gallons are there in 8 qt.? in 28 qt.?

2. The school lunchroom needs 36 glasses of milk (4 glasses to a quart). How many quarts of milk must be bought?

Tell what numbers should be put in the empty spaces:

3. $2 \times 4 = (\ )$ 8 contains ( ) 4's $8 \div 4 = (\ )$
4. $3 \times 4 = (\ )$ 12 contains ( ) 4's $12 \div 4 = (\ )$
5. $5 \times 4 = (\ )$ 20 contains ( ) 4's $20 \div 4 = (\ )$

6. Make a division table of 4's from your multiplication table of 4's, as you did in ex. 3, 4, and 5. Is your table like this one? Remember this table:

$4 \div 4 = 1$	$24 \div 4 = 6$
$8 \div 4 = 2$	$28 \div 4 = 7$
$12 \div 4 = 3$	$32 \div 4 = 8$
$16 \div 4 = 4$	$36 \div 4 = 9$
$20 \div 4 = 5$	$40 \div 4 = 10$

7. *Divide the following:*

$4)\underline{40}$ $4)\underline{24}$ $4)\underline{16}$ $4)\underline{20}$ $4)\underline{36}$ $4)\underline{32}$ $4)\underline{4}$ $4)\underline{28}$

Tell what numbers should be put in place of the dots:

8. $28 = \ldots 4$'s $36 = \ldots 4$'s $12 = \ldots 4$'s
9. $20 = \ldots 4$'s $16 = \ldots 4$'s $32 = \ldots 4$'s

10. Mother says that 4 cupfuls = 1 quart. If she uses 8 cups of milk, how many quarts is that? How many quarts are there in 12 cups? in 20 cups?

LEARNING ABOUT $\frac{1}{4}$

1. When one thing, like an apple, is divided into 4 equal parts, each part is called *one fourth* of the whole thing.

One fourth is written like this: $\frac{1}{4}$.

2. Which is larger, $\frac{1}{4}$ of an apple or $\frac{1}{2}$ of an apple?

3. Betsy has 12 daisies. She divides them into 4 equal groups. Each group has *one fourth*, or $\frac{1}{4}$, of the whole number of daisies.

4. Count how many daisies Betsy has in each group. Then divide 12 by 4. Is $\frac{1}{4}$ of 12 the same as $12 \div 4$?

To find $\frac{1}{4}$ of a number, divide it by 4.

5. Edwin earned \$24. He spent $\frac{1}{4}$ of it for a trip to the country. How much did the trip cost?

6. Alice has a piece of ribbon 20 in. long. She wants to make 4 badges of the same size from it. How many inches long will each badge be?

7. Grace earned \$16 by helping Mrs. Roth. She saved one fourth of it. How much did Grace save?

Find the following:

8.	$\frac{1}{4}$ of 8	$\frac{1}{4}$ of 32	$\frac{1}{4}$ of 28 men
9.	$\frac{1}{4}$ of 12	$\frac{1}{4}$ of 20	$\frac{1}{4}$ of 4 plums
10.	$\frac{1}{4}$ of 16	$\frac{1}{4}$ of 24	$\frac{1}{4}$ of 36 cents

MULTIPLYING LARGER NUMBERS BY 4

1. Susan bought 4 boxes of caramels, each costing 54¢. How much did she pay for this candy?

You must multiply 54 by 4.

Think "4 × 4 = 16." Write 6 and remember 1 to be carried.

Think "4 × 5 = 20. 20 + 1 = 21." Write 21.

$$\begin{array}{r} 54 \\ \times\ 4 \\ \hline 216 \end{array}$$

Susan paid 216¢, or $2.16, for the candy.

To check, go over your work again and see if you still get the same answer.

2. A hotel needed 84 tables, with 4 chairs for each table. How many chairs were needed?

3. Mr. Allison drove his automobile 165 miles a day for 4 days. How far did he travel?

4. Mr. Lee bought 4 second-hand cars for $235 apiece. How much did he pay for the 4 cars?

Multiply. Check by going over the work again:

5. 13 × 4	**9.** 23 × 4	**13.** 16 × 4	**17.** 114 × 4	**21.** 178 × 4	**25.** 115 × 4
6. 29 × 4	**10.** 52 × 4	**14.** 71 × 4	**18.** 182 × 4	**22.** 191 × 4	**26.** 162 × 4
7. 74 × 4	**11.** 64 × 4	**15.** 68 × 4	**19.** 247 × 4	**23.** 189 × 4	**27.** 196 × 4
8. 46 × 4	**12.** 87 × 4	**16.** 95 × 4	**20.** 106 × 4	**24.** 158 × 4	**28.** 234 × 4

DIVIDING ZERO BY A NUMBER

1. If you divide 4¢ equally among 4 boys, each boy will get $4¢ \div 4$, or 1¢.

2. You remember that 0 is read *zero* and means *not any;* hence 0¢ means *not any* cents, or *no* cents.

3. If you divide 0¢ among 4 boys, each boy will get $0¢ \div 4$, or *no* cents. This shows that $0 \div 4 = 0$.

4. $0 \div 4 = 0$ may also be written thus: $\begin{array}{r} 4\overline{)0} \\ 0 \end{array}$

5. How much is $0 \div 3$? $0 \div 2$? $5\overline{)0}$? $6\overline{)0}$?

6. Remember that **0 divided by any number is 0.**

Using Zero in Division

1. Divide 306 by 3.

Think "3 ÷ 3 = 1." Write 1 under 3.
Think "0 ÷ 3 = 0." Write 0 under 0.
Think "6 ÷ 3 = 2." Write 2 under 6.
The quotient is 102.
To check, multiply 102 by 3.

```
3)306
 102
Check
 102
   3
 306
```

2. Divide 140 by 2.

Think "14 ÷ 2 = 7." Write 7 under 4.
Think "0 ÷ 2 = 0." Write 0 under 0.

```
2)140
 70
```

Divide the following. Check by multiplying:

3. $2\overline{)406}$	**6.** $3\overline{)606}$	**9.** $3\overline{)150}$	**12.** $2\overline{)204}$
4. $2\overline{)180}$	**7.** $3\overline{)840}$	**10.** $4\overline{)808}$	**13.** $4\overline{)440}$
5. $3\overline{)903}$	**8.** $2\overline{)600}$	**11.** $3\overline{)270}$	**14.** $2\overline{)760}$

PLANTING FLOWERS

1. Bill's father has 68 hollyhocks. How many must he plant in a row to have 4 equal rows?

In dividing 68 by 4, think "6 ÷ 4 = 1, with 2 over." Write 1 under 6.

Think of 2 as written before 8, making 28. Think "28 ÷ 4 = 7." Write 7 under 8.

The quotient is 17; hence 17 hollyhocks should be planted in a row. Check by multiplying 17 by 4.

$$4\overline{)68}$$
$$17$$

2. He also has 428 daffodils. If he plants them in 4 equal rows, how many will each row contain?

Think "4 ÷ 4 = 1." Write 1 under 4. Think "There are no 4's in 2. Hence 2 ÷ 4 = 0, with 2 over." Write 0 under 2.

Think of 2 as written before 8; then think "28 ÷ 4 = 7." Write 7 under 8.

Each row will contain 107 daffodils.

$$4\overline{)428}$$
$$107$$

Exercises

Divide the following. Check by multiplying:

1. $4\overline{)64}$	**7.** $4\overline{)684}$	**13.** 408 ÷ 4	**19.** 9042 ÷ 2
2. $4\overline{)76}$	**8.** $4\overline{)568}$	**14.** 720 ÷ 4	**20.** 2040 ÷ 2
3. $4\overline{)92}$	**9.** $4\overline{)456}$	**15.** 880 ÷ 4	**21.** 6003 ÷ 3
4. $2\overline{)54}$	**10.** $4\overline{)812}$	**16.** 810 ÷ 2	**22.** 8400 ÷ 4
5. $3\overline{)45}$	**11.** $2\overline{)178}$	**17.** 918 ÷ 2	**23.** 9000 ÷ 3
6. $4\overline{)52}$	**12.** $3\overline{)927}$	**18.** 500 ÷ 2	**24.** 8204 ÷ 4

REMAINDERS IN DIVIDING BY 4

To find the remainder in short division examples, like 4)31, you must subtract 28 from 31 mentally. To do this rapidly, think "28 and what makes 31?" The remainder is 3 because $28 + 3 = 31$.

Subtract mentally. Give the remainder only:

1.	31	39	27	22	18	15	37	11
	28	36	24	20	16	12	36	8
2.	35	30	26	14	21	29	38	10
	32	28	24	12	20	28	36	8
3.	34	19	13	17	23	25	33	9
	32	16	12	16	20	24	32	8

When you can do the following exercises rapidly, you will be ready to divide larger numbers by 4.

Divide mentally. Give only quotient and remainder:

Thus in 4)14, say only "3, remainder 2."

4.	4)14	4)9	4)26	4)21	4)4	4)18	4)29	4)7
5.	4)23	4)6	4)33	4)38	4)27	4)22	4)31	4)0
6.	4)37	4)3	4)19	4)10	4)11	4)35	4)39	4)1
7.	4)30	4)5	4)17	4)34	4)13	4)15	4)25	4)2

8. Count by 4's to 40, like this: 4, 8, 12 ···
9. Count by 4's to 41, like this: 1, 5, 9, 13 ···
10. Count by 4's to 42, like this: 2, 6, 10, 14 ···

DIVIDING THREE-FIGURE NUMBERS

Mr. Fall sold a lot for \$304. He divided the money equally among his 4 sons. How much did each son get?

You must find $\frac{1}{4}$ of \$304.

$$4\overline{)304}\quad 76$$

Since there are no 4's in 3, find how many 4's there are in 30.

Think "30 ÷ 4 = 7, with 2 over." Write 7 under the 0 of 30. Imagine 2 written before 4, making 24. Think "24 ÷ 4 = 6." Write 6 under 4. The quotient is 76; hence each son got \$76.

Check the work by multiplying 76 by 4.

Exercises

1. Louise is making 116 paper hats for a party. She wants $\frac{1}{4}$ of them to be blue. How many blue hats should she make?

2. Four boys buy a boat for \$192. If they share the cost equally, how much does each boy pay?

Divide the following and check the work:

3. 4)144	**8.** 4)212	**13.** 4)312	**18.** 4)436	**23.** 4)132
4. 4)188	**9.** 4)260	**14.** 4)352	**19.** 4)136	**24.** 4)156
5. 4)264	**10.** 4)388	**15.** 4)180	**20.** 4)356	**25.** 4)216
6. 4)308	**11.** 4)104	**16.** 4)300	**21.** 4)296	**26.** 4)480
7. 4)100	**12.** 4)844	**17.** 4)804	**22.** 4)196	**27.** 4)252

28. Work ex. 23, 24, 25, 26, and 27 over again, dividing by 3 instead of by 4.

SELLING MILK AND CREAM

Mr. Crosby keeps a creamery. He gets milk and cream from the country and sells it in the city.

1. To-day Mr. Crosby received 156 gallons of milk which Joe, his helper, put into quart bottles. How many quart bottles did Joe fill?

Here 4 is to be multiplied by 156. It is much easier, however, to multiply 156 by 4 and it gives the same result. 4×156 equals 156×4, just as 4×9 equals 9×4.

2. Later Joe emptied 136 quart bottles into pint bottles. How many pint bottles did he fill?

3. To-day Mr. Crosby delivered 268 quart bottles of milk. How many gallons was that?

4. He also delivered 196 pint bottles of milk to his customers. How many quarts was that?

5. He sells cream in $\frac{1}{2}$-pint bottles. Yesterday he sold 272 bottles of cream. How many pints was that? how many quarts? how many gallons?

6. He delivered 76 quart bottles of milk to one hotel. How many gallons was that?

MULTIPLYING 5's

1. Count by 5's to 50, beginning 5, 10, 15.

2. Add these columns. How many are three 5's? four 5's? five 5's? six 5's?

			5
		5	5
	5	5	5
5	5	5	5
5	5	5	5
5	5	5	5
15	20	25	30

3. By adding columns of 5's, find how many seven 5's are; eight 5's; nine 5's; ten 5's.

4. Remember this table:

$1 \times 5 = 5$	$5 \times 5 = 25$	$9 \times 5 = 45$
$2 \times 5 = 10$	$6 \times 5 = 30$	$10 \times 5 = 50$
$3 \times 5 = 15$	$7 \times 5 = 35$	$0 \times 5 = 0$
$4 \times 5 = 20$	$8 \times 5 = 40$	$5 \times 0 = 0$

5. Draw rows of stars to show that $7 \times 5 = 5 \times 7$.

Multiply the following:

6. 4×5 $\quad 5 \times 4$ $\quad 3 \times 5$ $\quad 5 \times 3$

7. 8×5 $\quad 5 \times 8$ $\quad 9 \times 5$ $\quad 5 \times 9$

8. *Multiply the following as rapidly as you can:*

5	5	5	5	5	5	5	5	5	5
9	6	7	2	4	8	1	5	3	0

9. *Tell what numbers should be in place of the dots:*

$5 \times \ldots = 15$ $\quad 5 \times \ldots = 40$ $\quad 5 \times \ldots = 25$

$5 \times \ldots = 35$ $\quad 5 \times \ldots = 20$ $\quad 5 \times \ldots = 10$

DIVIDING BY 5

1. John bought a ball for 25¢ and paid for it in nickels. How many nickels did he give? How many nickels are there in 35¢? in 45¢? in 30¢?

What numbers should be put in the empty spaces?

2. $2 \times 5 = (\ )$ 10 contains ( ) 5's $10 \div 5 = (\ )$

3. $3 \times 5 = (\ )$ 15 contains ( ) 5's $15 \div 5 = (\ )$

4. $5 \times 5 = (\ )$ 25 contains ( ) 5's $25 \div 5 = (\ )$

5. Use your multiplication table as you did in ex. 2, 3, and 4 to make a division table of 5's. Compare your table with the one below.

6. Remember this table:

$5 \div 5 = 1$	$30 \div 5 = 6$
$10 \div 5 = 2$	$35 \div 5 = 7$
$15 \div 5 = 3$	$40 \div 5 = 8$
$20 \div 5 = 4$	$45 \div 5 = 9$
$25 \div 5 = 5$	$50 \div 5 = 10$

7. *Divide the following:*

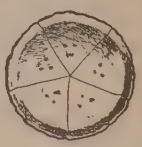
$5\overline{)45}$ $5\overline{)30}$ $5\overline{)15}$ $5\overline{)50}$ $5\overline{)20}$ $5\overline{)40}$ $5\overline{)35}$ $5\overline{)0}$

8. Sam gets 5¢ each time he runs an errand. He wants to buy a cap that costs 40¢. How many errands will he have to run to earn 40¢?

9. May has a half dollar and wants it changed into nickels. How many nickels will she get? How many nickels will she get for a quarter of a dollar?

LEARNING ABOUT $\frac{1}{5}$

1. Ann's mother cut a pie into 5 equal pieces. Each piece was *one fifth* of the whole pie.



When we divide *one thing*, like a pie, into 5 equal parts, each part is *one fifth* of the whole.

We write one fifth like this: $\frac{1}{5}$.

2. Grandfather divided 10 dimes equally among 5 girls. How many dimes did each girl get?

When a *group of things*, like 10 dimes, is divided into 5 equal parts, each part is also called *one fifth* of the whole.

3. How many are $\frac{1}{5}$ of 10 dimes? Is $\frac{1}{5}$ of 10 the same as $10 \div 5$?

To find $\frac{1}{5}$ of a number, divide it by 5.

4. Five boys weed a garden together. They earn 45¢, which they divide equally. How many cents does each boy get?

5. Divide 30¢ equally among 5 boys. Divide 20¢ among them. Divide 40¢ among them.

6. How much is $\frac{1}{4}$ of 40¢? How much is $\frac{1}{5}$ of 40¢? Which is larger, $\frac{1}{4}$ of 40¢ or $\frac{1}{5}$ of 40¢?

7. Which is larger, $\frac{1}{5}$ of a pie or $\frac{1}{4}$ of a pie?

8. What is $\frac{1}{5}$ of \$30? $\frac{1}{3}$ of \$30? $\frac{1}{2}$ of \$30? Which of these is the largest? Which is the smallest?

9. Find $\frac{1}{5}$ of 25 boys; of 45 books; of \$35.

SELLING ICE-CREAM CONES AT THE FAIR

1. At the school fair Rose sold 19 ice-cream cones at 5¢ each. How much did she receive in all?

In this problem 5×19 gives the right answer, because 5×19 is the same as 19×5.

2. Frank sold 138 ice-cream cones at 5¢ each. How much money did he collect in all?

Remember that 690¢ = $6.90.

3. Albert sold 47 ice-cream cones at 5¢ each. How much money did he take in?

Multiply. Check the work by going over it again:

4. 56¢ × 5	**11.** 141 × 5	**18.** 216 × 5	**25.** 117 × 5	**32.** 191 × 5
5. 28¢ × 5	**12.** 218 × 5	**19.** 131 × 5	**26.** 154 × 5	**33.** 258 × 5
6. 64¢ × 5	**13.** 167 × 5	**20.** 194 × 5	**27.** 135 × 5	**34.** 237 × 5
7. 33¢ × 5	**14.** 146 × 5	**21.** 285 × 5	**28.** 179 × 5	**35.** 163 × 5
8. 97¢ × 5	**15.** 298 × 5	**22.** 126 × 5	**29.** 175 × 5	**36.** 238 × 5
9. 21¢ × 5	**16.** 147 × 5	**23.** 106 × 5	**30.** 109 × 5	**37.** 108 × 5
10. 78¢ × 5	**17.** 105 × 5	**24.** 164 × 5	**31.** 137 × 5	**38.** 150 × 5

REMAINDERS IN DIVIDING BY 5

Subtract the following mentally:

In the first example, think "45 plus what makes 48?"

1.	48	28	37	43	49	19	36	27
	45	25	35	40	45	15	35	25
2.	44	47	18	24	34	38	17	46
	40	45	15	20	30	35	15	45

Divide mentally. Give only quotient and remainder:

Thus, in 5)48 say "9, remainder 3."

3.	5)48	5)38	5)41	5)32	5)26	5)21	5)4
4.	5)44	5)11	5)19	5)39	5)27	5)2	5)7
5.	5)16	5)49	5)34	5)1	5)36	5)14	5)9
6.	5)12	5)37	5)3	5)47	5)18	5)23	5)0
7.	5)17	5)24	5)28	5)31	5)42	5)33	5)8
8.	5)46	5)13	5)22	5)29	5)43	5)45	5)6

9. Count by 5's to 50, beginning 5, 10, 15.
10. Count by 5's to 46, beginning 6, 11, 16.
11. Count by 5's to 47, beginning 7, 12, 17.
12. Count by 5's to 48, beginning 8, 13, 18.
13. Count by 5's to 49, beginning 9, 14, 19.

DIVIDING BY 5

1. Elsie has 55¢. How many yards of ribbon can she buy at 5¢ a yard?

2. If 235 boys march by 5's in a parade, how many rows will there be?

3. John has all his money in nickels. He buys some parts for his radio for 75¢. How many nickels does he give the storekeeper?

4. George saves 5¢ a day. How long will it take him to save 90¢ for a toy sailboat?

5. Mary sold tickets at 5¢ each. She collected 65¢ in all. How many tickets did she sell?

6. Will tied 345 carrots in bunches, putting 5 carrots in a bunch. How many bunches did he have?

7. Mrs. Low had $33 with which to buy some dining-room chairs. If they cost $5 each, how many chairs could she buy for $33? How much money would she have left?

Divide the following. Check the work by multiplying:

8. 5)85	13. 5)475	18. 5)395	23. 5)125	28. 5)195
9. 5)60	14. 5)435	19. 5)385	24. 5)365	29. 5)225
10. 5)80	15. 5)375	20. 5)145	25. 5)355	30. 5)150
11. 5)95	16. 5)420	21. 5)320	26. 5)260	31. 5)165
12. 5)70	17. 5)300	22. 5)205	27. 5)105	32. 5)255

33. Divide ex. 28, 29, 30, 31, and 32 by 3.

CAN YOU DO ALL THESE THINGS?

1. Count by 2's to 50.
2. Count by 2's to 51, beginning with 1.
3. Count by 3's to 30.
4. Count by 3's to 31, beginning with 1.
5. Count by 3's to 32, beginning with 2.
6. Count by 4's to 40.
7. Count by 4's to 41, beginning with 1.
8. Count by 4's to 42, beginning with 2.
9. Count by 4's to 43, beginning with 3.
10. Count by 5's to 51, beginning with 1.
11. Count by 5's to 52, beginning with 2.

Add each of the following and check the work:

12.	13.	14.	15.	16.	17.	18.
7	8	8	8	9	3	9
3	6	3	6	7	4	1
4	5	8	2	0	8	9
9	8	7	5	5	8	6

19.	20.	21.	22.	23.
469	455	155	379	508
232	367	389	434	397

Subtract each of the following and check the work:

24.	25.	26.	27.	28.
624	207	953	664	702
205	134	728	295	513

29.	30.	31.	32.	33.
\$5.03	\$4.13	\$3.25	\$4.27	\$9.40
4.96	2.06	1.76	2.59	7.84

HOW MANY OF THESE CAN YOU DO?

Multiply. Check the work by going over it again:

1.	124 × 3	208 × 2	317 × 4	348 × 2	205 × 3	316 × 5
2.	235 × 4	263 × 3	355 × 2	265 × 4	157 × 5	169 × 3

Divide. Check the work by multiplying:

3.	2)54	3)72	4)56	4)252	4)228	4)236
4.	4)76	5)95	3)69	4)804	5)610	3)906
5.	5)75	3)81	2)90	5)125	5)420	5)400
6.	5)80	4)72	3)48	2)150	5)505	4)812

7. John's father has a poultry farm. He has 876 Leghorn chickens, 980 Plymouth Rock chickens, and 1224 Wyandotte chickens. How many chickens in all has he?

8. John helps gather the eggs. One day the Leghorns laid 589 eggs, the Plymouth Rocks laid 480 eggs, and the Wyandottes laid 683 eggs. How many eggs did John get that day?

9. The Leghorn eggs were sold for 5¢ each. How much did the 589 Leghorn eggs bring?

10. The other 1163 eggs were sold for 4¢ each. How much did they bring?

PROBLEMS

1. Edna's mother needs 14 yd. of wash line, which is sold by the foot. How many feet of wash line should she ask for?

2. Bert earned 96¢ and gave his brother $\frac{1}{4}$ of it. How much did he give his brother?

3. Mr. Fox gave our baseball team $25.00. We spent $14.43 for uniforms. How much had we left?

4. A large school used 18 gal. of ice cream at a party. How many quarts was that?

5. Joan has 6 dimes and 8 cents in her bank and 3 nickels in her purse. How much money has she?

6. Mr. Stone has 675 stamps. If he divides these equally among Ted and his 4 friends, how many stamps will each boy get?

7. Arthur bought 6 tickets to the circus at 55¢ each. How much did they cost in all?

Find each of the following:

8.	$\frac{1}{2}$ of 76	$\frac{1}{3}$ of 63	$\frac{1}{4}$ of 68	$\frac{1}{5}$ of 95
9.	$\frac{1}{3}$ of 96	$\frac{1}{4}$ of 80	$\frac{1}{2}$ of 92	$\frac{1}{5}$ of 345
10.	$96 \div 2$	$75 \div 3$	$52 \div 4$	$60 \div 5$

Tell what number should be put in place of the dots:

11.	$6 \times \cdots = 18$	$\cdots \times 3 = 27$	$24 = \cdots 4$'s
12.	$4 \times \cdots = 20$	$\cdots \times 4 = 32$	$45 = \cdots 5$'s
13.	$3 \times \cdots = 12$	$\cdots \times 5 = 30$	$14 = \cdots 2$'s
14.	$9 \times \cdots = 18$	$\cdots \times 2 = 16$	$21 = \cdots 3$'s

CHAPTER III

NUMBERS TO TEN THOUSAND

1. Dates, telephone numbers, and house numbers, are often written with four figures. Thus, we may write Dec. 25, 1928 or 1734 Main Street.

2. Count by 100's to 1000. How many 100's make 1000?

3. Numbers that stand for thousands are read thus:

2000 is read *2 thousand.*

10,000 is read *10 thousand.*

1300 is read *13 hundred* or *1 thousand 3 hundred.*

1276 is read *1 thousand 2 hundred 76* or *12 hundred 76.*

1003 is read *1 thousand 3* or *10 hundred 3.*

4. Notice that a comma is put after the thousands in a 5-figure number like 10,000. This makes the number easier to read. In a 4-figure number like 2672, however, the comma is usually omitted.

5. Read 6000; 1700; 1425; 1776; 1928; 5008.

6. Count by 1000's to 10,000, like this: 1000, 2000, 3000, and so on.

READING AND WRITING NUMBERS

Read these sentences:

1. May Green lives at 3597 Maple Hill Road.
2. Our automobile license is number 9478.
3. There were 7592 people at the baseball game.

Read these numbers:

4.	9000	1200	1986	3347	5624
5.	3009	9704	4557	4700	8001
6.	7007	6607	9437	2500	2908

Write the following numbers in figures:

7. Four thousand
8. Fourteen hundred
9. One thousand five
10. Seven thousand fifteen
11. Eight thousand eighteen
12. Twelve hundred forty-seven
13. Three thousand five hundred sixty-two

14. The telephone number of Paul's aunt is Hillside 7608. When Paul wishes to call her, he says to the operator, "Hillside seven, six, o, eight." A zero in a telephone number is pronounced like the letter o.

15. Tell how you would call these telephone numbers: Tremont 1928, South 9084, Orange 340.

16. The year 1928 is read *nineteen twenty-eight.* Read these years: 1776, 1492, 1914, 1930, 1888.

ANOTHER WAY TO WRITE NUMBERS

1. Some clocks and watches have the numbers written with certain letters which we call *Roman numerals*. Roman numerals are used also in numbering chapters of books and in writing dates on buildings.

2. Here are the first ten Roman numerals and the numbers they stand for:

I	II	III	IIII or IV	V	VI	VII	VIII	IX	X
1	2	3	4	5	6	7	8	9	10

3. If you write X before any of these numbers, you add 10 to that number.

Thus, writing X before III gives XIII, which is 10 + 3, or 13. Writing X before IX gives XIX, which is 10 + 9, or 19. Likewise, XV = 15 and XX = 20.

4. Read these numbers: XI, XVIII, XIV, XVII.

5. Write in Roman numerals the numbers of the next two chapters after Chapter XIV in Ada's book.

6. The last chapter in Frank's book is Chapter XIX. How many chapters does the book contain?

7. Write in Roman numerals: 11, 14, 16, 17, 18.

8. By writing XX before any one of the first ten numbers, you add 20 to that number.

Thus, if you put XX before V you get XXV, which is 20 + 5, or 25. Likewise, XXIV = 20 + 4, or 24.

9. Read: XXII, XXVI, XXVII, XXX.

10. Write in Roman numerals: 21, 23, 26, 29, 30.

DRILL IN ADDING BY ENDINGS

Add the following orally:

1.	6	16	36	56	12	22	42	82
	3	3	3	3	8	8	8	8
2.	9	29	59	79	7	27	57	67
	5	5	5	5	4	4	4	4
3.	7	37	77	87	6	16	36	56
	8	8	8	8	9	9	9	9

Add orally each of the numbers 3, 2, 1, 6, 5, 4, 9, 7, *and* 8 *in turn to each of the following numbers:*

4.	32	62	42	82	37	17	47	67
5.	54	74	64	44	23	83	33	73
6.	48	68	38	78	46	86	56	66
7.	25	75	85	45	39	59	79	89

8. Count by 4's to 61, beginning with 1; to 62, beginning with 2; to 63, beginning with 3.

9. Beginning with 1, count by 5's until you pass 60. Repeat, beginning with 2, 3, and 4 in turn.

10. Beginning with 1, count by 6's until you pass 60. Repeat, beginning with 2, 3, 4, and 5 in turn.

11. Beginning with 1, count by 7's until you pass 60. Repeat, beginning with 2, 3, 4, 5, and 6 in turn.

NOTE TO TEACHER. Exercises like 8 to 11 are a valuable form of oral drill in adding by endings and should be given frequently as a preparation for column addition.

HOW TO ADD COLUMNS RAPIDLY

In adding a long column, begin at the bottom and add up. Check the sum by adding the column again, beginning at the top and adding down.

In adding the column shown here, think only "7, 16, 24, 28, 33, 42." In checking, think "9, 14, 18, 26, 35, 42." If you cannot add columns rapidly in this way, it will help you if you practice frequently the work on page 122.

9
5
4
8
9
7
42

Practice in Adding

Add without copying, writing the answers on folded paper. Check the work by adding down:

1.	2.	3.	4.	5.	6.	7.
9	7	3	8	5	5	9
1	6	6	7	9	9	8
8	2	7	5	4	6	9
5	9	9	5	9	7	8
3	1	8	4	8	3	7
8	5	9	9	7	1	5

8.	9.	10.	11.	12.	13.	14.
3	5	8	7	4	5	2
4	3	4	4	6	7	3
3	9	6	5	5	6	9
9	5	7	1	4	1	6
5	2	8	1	9	5	5
2	9	9	3	3	2	4
5	3	2	4	6	7	8

NOTE. For the use of folded paper in writing answers, see the note at the bottom of page 58.

PRACTICE IN COLUMN ADDITION

Practice until you can add and check ex. 1 *to* 8 *in* 3 *minutes and ex.* 9 *to* 16 *in* 5 *minutes (after copying):*

1.	2.	3.	4.	5.	6.	7.	8.
8	9	8	5	8	3	7	5
6	8	6	2	3	2	8	1
4	3	0	9	7	9	4	7
9	7	4	4	4	8	3	6
3	6	7	4	5	8	8	2

9.	10.	11.	12.	13.	14.	15.	16.
7	8	5	8	7	6	1	1
5	3	9	6	5	2	8	6
0	6	2	0	6	4	7	4
7	5	8	1	0	3	5	1
2	4	3	5	5	3	2	5
5	9	1	2	6	3	2	4
8	7	4	9	8	9	7	9

Add without copying, and check the work:

17.	18.	19.	20.	21.	22.
64	96	43	45	70	93
91	25	18	38	47	24
16	42	87	53	21	91
32	58	59	77	87	57
94	43	43	94	35	26

23.	24.	25.	26.	27.	28.
51	70	92	81	60	95
22	21	36	92	54	34
38	46	14	24	91	66
16	39	93	65	11	72
98	86	75	76	25	65
36	97	99	59	17	36

PROBLEMS

1. When Amy graduated, her mother bought her a dress for \$12.75, a pair of satin pumps for \$5.85, and a pair of silk stockings for \$1.15. What was the cost of Amy's outfit?

2. Sam had \$11.49 in his bank and Andrew had \$15.62. They put their savings together to buy a bicycle. How much could they spend for it?

3. Alice is buying furniture for her dolls. The dining-room set costs 75¢; the bedroom set, 69¢; the living-room set, 95¢; the kitchen set, 49¢; and the music-room set, 85¢. How much does all the furniture cost Alice?

4. Mrs. Lewis is buying some new furniture for Dorothy's room: a bureau for \$12.75, a rug for \$8.50, a pair of lace curtains for \$4.85, and a chair for \$9.70. How much does she pay for all the furniture?

Add orally, beginning at the bottom of each column. Check the work by adding down:

In ex. 5, think "40, 47, 50," and so on.

5.	6.	7.	8.	9.	10.	11.	12.
6	6	3	3	6	8	5	7
7	4	8	6	4	8	2	8
8	5	9	4	9	1	3	2
4	6	7	7	4	4	2	7
3	9	8	7	9	7	5	3
7	8	6	8	7	7	7	9
40	50	40	50	60	60	50	60

DID PAUL MAKE A MISTAKE?

Paul's father, who is a bookkeeper, is teaching his son to add. It is very important for a bookkeeper to add correctly. He has asked Paul to do the examples below.

Here are the examples with Paul's answers. Has he made any mistakes? Go over each problem carefully. If you find a mistake, tell what the correct sum should be.

1.	2.	3.	4.	5.
996	984	993	707	286
876	707	858	647	968
535	157	388	298	729
2407	1838	2239	1655	1983

6.	7.	8.	9.	10.
$2.80	$4.53	$4.50	$9.83	$7.28
9.64	5.15	4.49	2.41	1.20
6.34	3.09	3.07	1.52	6.41
4.45	6.48	7.37	5.29	1.16
4.86	7.63	1.56	6.16	8.29
$28.09	$26.88	$21.09	$25.21	$24.34

Also see if Paul did these correctly:

11.	12.	13.	14.
$89.26	$41.92	$37.96	$43.72
76.84	39.09	94.78	45.28
$165.10	$81.01	$132.74	$89.00

15.	16.	17.	18.
$33.79	$78.19	$91.39	$57.32
2.56	4.98	8.79	8.88
$36.35	$83.17	$100.08	$66.20

SUBTRACTING LARGER NUMBERS

1. Ed has saved \$30.00. He buys a second-hand bicycle for \$12.75. How much has he left?

You must subtract \$12.75 from \$30.00. To do this, find what number you must add to \$12.75 to make \$30.00.

Think "5 + **5** = 10." Write 5.

Carry the 1 of 10 and add it to 7, which makes 8. Think "8 + **2** = 10." Write 2.

Carry 1 and add it to 2, which makes 3. Think "3 + **7** = 10." Write 7.

Carry 1 and add it to 1, which makes 2. Think "2 + **1** = 3." Write 1.

	\$30.00
	12.75
	\$17.25

The difference is \$17.25. Hence Ed has \$17.25 left.

Check by adding \$17.25 to \$12.75, adding up.

2. Find the difference between 596 and 9324.

Think "6 + **8** = 14." Write 8; carry 1.

Think "1 (carried) + 9 = 10. 10 + **2** = 12." Write 2; carry 1.

Think "1 (carried) + 5 = 6. 6 + **7** = 13." Write 7; carry 1.

Think "1 (carried) + **8** = 9." Write 8. The difference is 8728.

	9324
	596
	8728

Check by adding 8728 to 596, adding up.

Copy and subtract. Check your work:

3. \$97.81	**5.** \$95.31	**7.** \$90.00	**9.** \$70.00
46.98	46.45	48.37	26.65
4. \$20.00	**6.** \$16.25	**8.** \$47.83	**10.** \$62.00
4.87	2.87	3.96	21.34

EXERCISES IN SUBTRACTION

1. Dick needs for his radio set a new part which costs $10.75. He has $8.85 in his bank. How much more must he earn to have enough to buy the part?

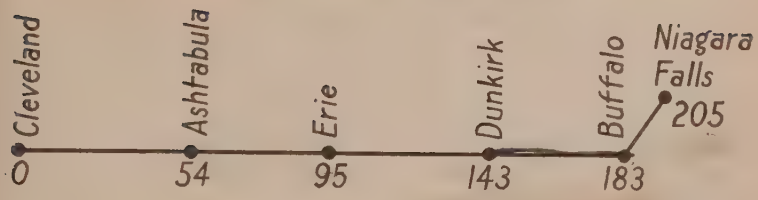
Copy and subtract the following. Check the work:

2. 8312 4643	**3.** 9351 4852	**4.** 9155 277	**5.** 6411 68
6. 8540 853	**7.** 2932 947	**8.** 4270 587	**9.** 1311 87
10. 8521 43	**11.** 2733 97	**12.** 9706 96	**13.** 2166 69

Subtract without copying, and check the work. See how many of these examples you can work and check in 6 minutes:

14. $75.45 29.38	**15.** $58.84 17.86	**16.** $85.37 35.69	**17.** $70.00 16.55
18. $76.04 47.24	**19.** $53.28 13.98	**20.** $41.00 17.90	**21.** $82.23 56.45
22. $58.41 8.81	**23.** $91.71 15.78	**24.** $56.86 5.98	**25.** $55.29 37.53
26. $90.00 2.14	**27.** $73.31 12.43	**28.** $49.42 9.88	**29.** $50.00 27.48

A TRIP TO NIAGARA FALLS



John lives in Cleveland. Last week he went with his father on the train to visit Niagara Falls.

Above is a map of the railroad from Cleveland to Niagara Falls, with the names of some of the cities which John passed through. The numbers show how many miles each city is from Cleveland. Thus, Erie is 95 miles from Cleveland.

1. How many miles is it from Cleveland to Dunkirk? from Cleveland to Buffalo? to Niagara Falls?

2. How can you tell how many miles it is from Ashtabula to Erie? How many miles is it?

3. The train went from Erie to Dunkirk in an hour. How many miles did it go that hour?

4. How far is it from Erie to Buffalo? from Dunkirk to Buffalo? from Ashtabula to Dunkirk?

5. At Dunkirk, John asked how many more miles it was to Niagara Falls. How many was it?

6. When they started on the trip, John's father had $80.00. When they got home, he had $17.83 left. How much did the trip cost?

HOW JOHN MAKES CHANGE

1. John helps in his father's store. Mary buys 18 cents' worth of candy and gives John a quarter. John makes the change like this: He first thinks 18¢; then he picks up 2 cents and thinks 20¢; then he picks up a nickel and thinks 25¢. As he gives Mary the 2 cents and the nickel, one at a time, he says "18, 19, 20, 25."

2. Dan buys a top for 12¢ and gives John a half dollar. John thinks 12¢; then he picks up 3 cents and thinks 15¢; then he picks up a dime and thinks 25¢; then he picks up a quarter and thinks 50¢. As he gives Dan these coins, one at a time, he says, "12, 13, 14, 15, 25, 50."

3. When John makes change for 12¢ from 50¢, he starts with 12¢ and adds coins until the sum is 50¢. Always make change as John does. You have not time to subtract 12 from 50 on paper.

4. Remember:

25¢ + 25¢ = 50¢	**50¢ + 50¢ = $1.00**
50¢ + 25¢ = 75¢	**75¢ + 25¢ = $1.00**

5. *Make change from* 50¢ *when the purchase is:*

18¢ 23¢ 32¢ 7¢ 3¢ 13¢ 28¢

6. *Make change from* $1.00 *for these purchases:*

22¢	15¢	37¢	85¢	8¢	62¢	41¢
12¢	27¢	73¢	94¢	4¢	17¢	31¢

MAKING CHANGE

1. May bought lace for 28¢ and gave the clerk $1.00. The clerk gave her 2 cents, 2 nickels, a dime, and 2 quarters. Count this change as the clerk did. Is it right? Make the change using fewer coins.

2. At a fruit store Tom bought pears for 25¢ and plums for 14¢. How much change did he get from a dollar? Make the change in two different ways.

3. Louise bought a pair of gloves for $1.65. She handed the clerk a 5-dollar bill. She received a dime, a quarter, and 3 one-dollar bills in change. Was it right? How should you count the change if you were the clerk?

4. Sam bought a sweater for $3.18 and gave the clerk a 5-dollar bill. Make and count out his change.

5. *How do you make change from a 2-dollar bill:*
(*a*) If Mary buys bread for 9¢ and butter for 27¢?
(*b*) If Roy buys candy for 15¢ and peaches for 18¢?
(*c*) If Earl buys a book for 35¢ and a pad for 13¢?

6. Make change from $5.00 when some one buys, at one time, a doll for $2.08 and a ball for $.65.

7. Mr. Hart gives a clerk a half dollar and asks for 6 nickels and the rest of the change in dimes. How many dimes does he get?

8. Joe wants $1.00 changed so that he gets 2 quarters and the rest in nickels. How many nickels does he get?

MULTIPLYING 6's

1. Count by 6's to 60.

2. By adding columns of 6's, find how many three 6's are; four 6's; five 6's; six 6's; seven 6's; eight 6's; nine 6's.

3. How many 6's are there in 18? in 24? in 30?

		6
	6	6
6	6	6
6	6	6
6	6	6
18	24	30

Tell what numbers should be put in the spaces:

4. $2 \times 6 = (\ )$ 12 contains ( ) 6's $12 \div 6 = (\ )$

5. $3 \times 6 = (\ )$ 18 contains ( ) 6's $18 \div 6 = (\ )$

6. Continue the work in ex. 5 up to 9×6.

7. Remember these tables:

$1 \times 6 = 6$	$6 \times 6 = 36$	$6 \div 6 = 1$	$36 \div 6 = 6$
$2 \times 6 = 12$	$7 \times 6 = 42$	$12 \div 6 = 2$	$42 \div 6 = 7$
$3 \times 6 = 18$	$8 \times 6 = 48$	$18 \div 6 = 3$	$48 \div 6 = 8$
$4 \times 6 = 24$	$9 \times 6 = 54$	$24 \div 6 = 4$	$54 \div 6 = 9$
$5 \times 6 = 30$	$10 \times 6 = 60$	$30 \div 6 = 5$	$60 \div 6 = 10$

8. Memorize: **$6 \times 0 = 0$** **$0 \times 6 = 0$** **$0 \div 6 = 0$**

9. *Multiply the following at sight:*

6	6	6	6	6	6	6	6	6
4	6	0	1	8	5	3	9	2

10. *Divide the following at sight:*

$6)0$ $6)30$ $6)18$ $6)48$ $6)42$ $6)24$ $6)36$ $6)54$

MULTIPLYING BY 6

1. Since $4 \times 6 = 24$, what does 6×4 equal?

Multiply the following at sight:

2. 5×6 $\quad 6 \times 5$ $\quad\quad 9 \times 6$ $\quad 6 \times 9$

3. 7×6 $\quad 6 \times 7$ $\quad\quad 8 \times 6$ $\quad 6 \times 8$

4. Write the 6's table in another way, like this: $6 \times 1 = 6$, $\quad 6 \times 2 = 12$, $\quad 6 \times 3 = 18$, $\quad$ and so on.

5. *Multiply the following as rapidly as you can:*

6	10	6	6	9	6	6	8	6	6
5	6	2	0	6	1	9	6	6	7
6	0	7	1	6	6	4	5	3	2
3	6	6	6	4	8	6	6	6	6

6. If the street-car fare is 6¢, how much will 7 rides cost? How many times can you ride for 30¢?

7. *Find the cost of:*

6 cakes at 7¢ each $\quad\quad$ 6 pads at 8¢ each

6 balls at 9¢ each $\quad\quad$ 6 pads at 5¢ each

8. Multiply each number on the circle by 6 and add 4 to the product. Repeat, adding 3 to each product. Repeat, adding 2 to each product.

9. Maud needs 24 buttons for her new dress. How many cards must she buy if each card contains 6 buttons?

LEARNING ABOUT $\frac{1}{6}$

1. This pie is cut into 6 pieces, each of the same size. Each piece is what part of the whole pie?

2. Here are 12 stars in 6 equal groups. What do you call each group?

★★ ★★ ★★

★★ ★★ ★★

3. When one thing or a group of things is divided into 6 equal parts, each part is called *one sixth* of the whole. One sixth is written thus: $\frac{1}{6}$.

4. Compare $\frac{1}{6}$ of 18 with $18 \div 6$. Are they the same?

To find $\frac{1}{6}$ of a number, divide it by 6.

5. Mary bought 6 pencils for 36¢. How much did each pencil cost? How many could she buy for 48¢? how many for 42¢?

6. Will divides 30 apples equally among 6 boys. How many apples does each boy get?

7. In 30 minutes Carl picked 3 boxes of berries, Ned picked 6 boxes, and Bob, 5 boxes. How many minutes did it take each boy to pick a box?

8. Into how many parts is each of these pies divided? Is $\frac{1}{6}$ of a pie larger or smaller than $\frac{1}{5}$ of a pie?

9. Make a table like this:

$\frac{1}{6}$ of 6 = 1, $\frac{1}{6}$ of 12 = 2, $\frac{1}{6}$ of 18 = 3, and so on.

USING THE TABLES

Practice until you can multiply and check 12 *of the following examples in* 4 *minutes* (*after copying*). *Check the work by going over it:*

1. 21 × 6	10. 75 × 3	19. 33 × 5	28. 65 × 4	37. 61 × 7	46. 68 × 3
2. 17 × 6	11. 51 × 6	20. 46 × 2	29. 72 × 6	38. 36 × 7	47. 15 × 8
3. 15 × 6	12. 38 × 6	21. 14 × 6	30. 58 × 3	39. 22 × 8	48. 62 × 8
4. 13 × 6	13. 85 × 6	22. 95 × 6	31. 62 × 6	40. 44 × 4	49. 55 × 3
5. 61 × 5	14. 91 × 6	23. 26 × 6	32. 90 × 6	41. 65 × 6	50. 16 × 6
6. 65 × 7	15. 62 × 4	24. 48 × 6	33. 67 × 6	42. 27 × 6	51. 34 × 6
7. 65 × 8	16. 61 × 8	25. 67 × 4	34. 49 × 6	43. 39 × 6	52. 81 × 6
8. 64 × 8	17. 64 × 3	26. 26 × 9	35. 26 × 3	44. 70 × 6	53. 45 × 6
9. 25 × 4	18. 36 × 3	27. 36 × 9	36. 62 × 7	45. 86 × 5	54. 68 × 6

HOW TO MULTIPLY DOLLARS AND CENTS

1. How much do 4 pairs of kid gloves cost at $2.75 a pair?

Multiply dollars and cents just as you multiply other numbers. Then place the decimal point before the last two right-hand figures in the product, to separate the dollars from the cents. In other words, "point off two places" in the product.

$$\begin{array}{r} \$2.75 \\ 4 \\ \hline \$11.00 \end{array}$$

You see that the gloves cost $11.00.

2. Louise needs 5 quarts of ice cream for her party. How much will it cost at 65¢ a quart?

First write 65¢ as $.65. Then multiply just as you multiply other numbers, putting the decimal point before the last two figures in the product to separate the dollars from the cents.

$$\begin{array}{r} \$ .65 \\ 5 \\ \hline \$3.25 \end{array}$$

You see that the ice cream will cost $3.25.

Exercises in Multiplication

1. The tickets to a summer camp cost $4.18 each. How much will the tickets cost for 6 boys?

2. Laura earned 75¢ a day taking care of Mrs. Brown's baby. How much did she earn in 6 days?

Multiply. Check the work by going over it again:

3. $\$.46$	**5.** $\$.95$	**7.** $\$.63$	**9.** $\$.78$	**11.** $\$.57$
$\times\ 6$	$\times\ 5$	$\times\ 4$	$\times\ 6$	$\times\ 6$
4. $\$9.25$	**6.** $\$6.43$	**8.** $\$7.08$	**10.** $\$4.25$	**12.** $\$4.75$
$\times\ 4$	$\times\ 6$	$\times\ 6$	$\times\ 6$	$\times\ 5$

BUYING BOOKS FOR THE CHILDREN'S LIBRARY

1. Our librarian orders 5 copies of "Alice in Wonderland." How much do they cost at $1.72 a copy?

2. There are 6 "Little Black Sambo" books in a set. At $.57 each, how much does a set cost?

3. How much do 4 copies of "Robinson Crusoe" cost at $1.68 each? How much do 6 copies cost?

4. How much do 3 copies of "Just So Stories" cost at $2.35 a copy?

5. Make up other problems about buying books that you would like to have in the library.

Exercises in Multiplication

Multiply, and check your work:

1. $7.19 × 6	5. $3.75 × 6	9. $8.62 × 6	13. $1.49 × 6	17. $8.63 × 6
2. $2.50 × 6	6. $4.86 × 6	10. $5.07 × 6	14. $1.94 × 6	18. $3.27 × 6
3. $ .85 × 6	7. $ .96 × 6	11. $ .34 × 6	15. $ .27 × 6	19. $ .68 × 6
4. $9.54 × 6	8. $3.02 × 6	12. $6.75 × 6	16. $8.09 × 6	20. $4.37 × 6

21. Do ex. 1 to 10 again, multiplying by 5 instead of by 6; multiplying by 4 instead of by 6.

PREPARING FOR SHORT DIVISION BY 6

Subtract at sight:

Think "36 and what are 41?"

1.	41	40	23	53	35	50	22	20
	36	36	18	48	30	48	18	18
2.	47	51	39	21	59	52	28	45
	42	48	36	18	54	48	24	42

Divide, giving only quotients and remainders. Practice until you can do ex. 3 *to* 8 *orally in* $2\frac{1}{2}$ *minutes:*

Thus, in 6)50, say "8, remainder 2."

3.	6)50	6)38	6)22	6)35	6)57	6)49	6)37
4.	6)47	6)40	6)10	6)52	6)14	6)55	6)13
5.	6)8	6)53	6)11	6)28	6)9	6)19	6)58
6.	6)7	6)29	6)15	6)45	6)41	6)31	6)34
7.	6)51	6)16	6)43	6)27	6)26	6)20	6)17
8.	6)33	6)21	6)32	6)39	6)23	6)44	6)59

9. If pencils cost 6¢ each, how many can you buy for 5¢? Ed says that you cannot buy any, but that you will still have your 5¢. Is he right?

10. You see in ex. 9 that 6)5 = 0, with a remainder of 5. Likewise, 6)4 = 0, with a remainder of 4.

11. What does 6)3 equal? What does 6)0 equal?

MONTHLY PAYMENTS ON AN AUTOMOBILE

1. Mr. Bart buys a car for \$876 and agrees to pay for it in 6 months, paying the same amount each month. How much must he pay each month?

You must find $\frac{1}{6}$ of 876.

Think "8 ÷ 6 = 1, with 2 over." Write 1 under 8.

$$6\overline{)876}$$
$$146$$

Think of 2 as written before 7, making 27. Then think "27 ÷ 6 = 4, with 3 over." Write 4 under 7.

Think of 3 as written before 6, making 36. Then think "36 ÷ 6 = 6." Write 6 under 6.

The quotient is 146. Mr. Bart must pay \$146 each month.

Check your work by multiplying 146 by 6.

2. Find $\frac{1}{6}$ of 1830.

Think "18 ÷ 6 = 3." Write 3 under 8.

Think " 3 ÷ 6 = 0, with 3 over." Write 0 under 3.

$$6\overline{)1830}$$
$$305$$

Think of 3 as written before 0, making 30. Then think "30 ÷ 6 = 5." Write 5 under 0. The quotient is 305.

Exercises

1. Mr. Lewis buys a second-hand car for \$288. He agrees to pay $\frac{1}{6}$ of this amount each month for 6 months. How much does he pay each month?

2. Mr. Grant owes \$612 on a car and agrees to pay $\frac{1}{6}$ of that amount each month for 6 months. How much must he pay each month?

3. Mr. Day buys a car for \$900. He pays \$250 cash and $\frac{1}{5}$ of the rest each month for 5 months. How much does he pay each month?

PROBLEMS

1. *A dozen* means 12. How many eggs are half a dozen eggs?

2. Dick had 738 eggs to pack in paper boxes, each box holding half a dozen eggs. How many boxes did he fill?

3. Mr. Jones sold an automobile for $1404 and divided the money equally among his 6 sons. How much did each son get?

4. Irene has 50¢. How many yards of ribbon can she buy at 6¢ a yard? How much money will she have left?

5. John's schoolroom has 6 seats in a row. How many rows will be filled by a class of 33? How many will sit in a row that is partly filled?

Divide the following. Check the work by multiplying:

6. 6)66	13. 6)300	20. 6)708	27. 4)8164
7. 6)78	14. 6)384	21. 6)972	28. 5)5305
8. 6)96	15. 6)102	22. 6)894	29. 6)1248
9. 6)84	16. 6)402	23. 6)468	30. 5)5450
10. 6)90	17. 6)510	24. 6)804	31. 6)6150
11. 6)186	18. 6)420	25. 6)816	32. 6)2436
12. 6)240	19. 6)504	26. 6)618	33. 6)6540

STUDYING THE CLOCK

1. The long hand on a clock is the *minute hand* and the short hand is the *hour hand.* On this clock the hour hand points to 7 and the minute hand to 12. It is 7 o'clock.

2. The little spaces marked off on the edge of the clock are minutes. How many minutes are there between the 12 and the 1? When the minute hand in the above clock moves from 12 to 1, it is 5 minutes past 7 o'clock.

3. Beginning at 1, point to each number on the clock and count the minutes by 5's. How many minutes make 1 hour?

4. Learn this table of *time:*

60 minutes (min.) = 1 hour (hr.)
24 hours (hr.) = 1 day (da.)

5. What is $\frac{1}{2}$ of 60? $\frac{1}{4}$ of 60? How many minutes make a half hour? a quarter of an hour?

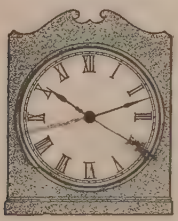
6. At 30 minutes past 7, it is *half past seven.* Write half past seven thus: 7.30 or 7 : 30 or 7 30.

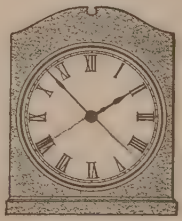
7. On the first clock it is a *quarter past* 7, or 7.15. On the second clock it is *a quarter to* 8, or 7.45.

PROBLEMS

1. Many clocks have the numbers in Roman numerals. To what does the hour hand on this clock point? the minute hand? What time is it?

2. It is 12 minutes past 10 on the first clock below. We write it 10.12. What time is it on the other two clocks?





3. Make a clock face out of cardboard and set the hands to show 10.15; 10.17; 10.21; 10.33; 10.45; 10.59; 11.00; 11.03; 11.30; 1.35; 1.55; 2.00.

A Class Program

1. This program tells when each period begins:

9.00 Singing	10.25 Writing	1.00 Study Period
9.15 Arithmetic	10.45 Recess	1.25 Composition
9.40 Spelling	11.00 Reading	1.55 Gymnasium
9.50 Free	11.25 Art	2.20 Nature Study
9.55 History	12.00 Lunch	2.45 School Closes

Tell how many minutes are given to each subject.

2. Noon comes at 12 o'clock. A.M. written after the time means *before noon;* P.M. means *after noon.*

MULTIPLYING AND DIVIDING BY 7

1. How many are three 7's? six 7's? nine 7's?

2. How many 7's are there in 28? in 56? in 49?

3. Make multiplication and division tables for 7's, as on page 132 for 6's. Compare with those below.

4. Remember these tables:

$1\times7=7$	$6\times7=42$	$7\div7=1$	$42\div7=6$
$2\times7=14$	$7\times7=49$	$14\div7=2$	$49\div7=7$
$3\times7=21$	$8\times7=56$	$21\div7=3$	$56\div7=8$
$4\times7=28$	$9\times7=63$	$28\div7=4$	$63\div7=9$
$5\times7=35$	$10\times7=70$	$35\div7=5$	$70\div7=10$

5. Remember: $7\times0=0$ $\quad 0\times7=0$ $\quad 0\div7=0$

6. Put seven 8's in a column and add them. Then add eight 7's. Does $7\times8=8\times7$?

Multiply the following at sight:

7. 7×8 $\quad 8\times7$ $\quad 7\times6$ $\quad 6\times7$

8. 7×5 $\quad 5\times7$ $\quad 7\times9$ $\quad 9\times7$

9. *Multiply as rapidly as you can:*

7	7	2	7	7	3	0	7	7	10
2	0	7	7	4	7	7	9	1	7
7	7	1	4	5	7	9	8	6	7
3	5	7	7	7	6	7	7	7	8

10. *Divide at sight:*

$7)\underline{14}$ $\quad 7)\underline{42}$ $\quad 7)\underline{0}$ $\quad 7)\underline{35}$ $\quad 7)\underline{63}$ $\quad 7)\underline{28}$ $\quad 7)\underline{49}$ $\quad 7)\underline{56}$

USING 7's

1. Count by 7's to 70.

2. Write the 7's table in another way, like this: $7 \times 1 = 7$, $7 \times 2 = 14$, $7 \times 3 = 21$, and so on.

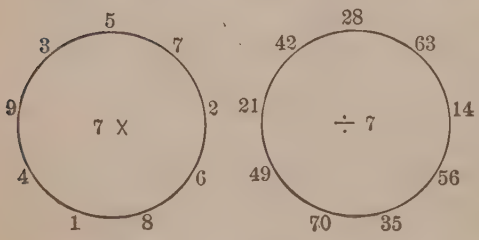
3. Find the cost of:

7 oranges at 6¢ each	5 pencils at 7¢ each
7 pears at 7¢ each	9 tickets at 7¢ each

4. There are 7 days in a week. How many days are there in 5 weeks? in 3 weeks? in 8 weeks?

5. How many weeks are there in 28 days?

6. Multiply each number on the first circle by 7 and add 3 to the product. Repeat, adding 4 to each product.



7. Divide each number on the second circle by 7.

Tell what numbers belong in the empty spaces:

8. $6 \times (\ ) = 42$ $3 \times (\ ) = 21$ $7 \times (\ ) = 14$
9. $7 \times (\ ) = 35$ $7 \times (\ ) = 28$ $7 \times (\ ) = 42$
10. $8 \times (\ ) = 56$ $7 \times (\ ) = 49$ $9 \times (\ ) = 63$

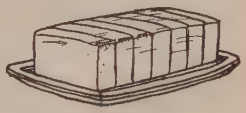
Multiply the following. These are often found to be especially difficult. Practice them over and over again:

11.

8	9	7	8	9	6	7	6	7	6
7	7	6	6	6	8	9	7	8	9

LEARNING ABOUT $\frac{1}{7}$

1. This cake is cut into 7 equal pieces. Each piece is called *one seventh* of the whole cake; 2 pieces are *two sevenths* of the cake.



2. How many sevenths of a cake are there in a whole cake?

3. Divide 21 marbles into 7 equal parts. What do you call one part? two parts?

4. When one thing or a group of things is divided into 7 equal parts, each part is called *one seventh*, or $\frac{1}{7}$, of the whole.

5. What is $\frac{1}{7}$ of 21? What is $21 \div 7$?

To find $\frac{1}{7}$ of a number, divide it by 7.

6. John's brother saves $\frac{1}{7}$ of all he earns. Last month he earned \$63. How much did he save?

7. Make a table beginning like this:
$\frac{1}{7}$ of $7 = 1$, $\frac{1}{7}$ of $14 = 2$, $\frac{1}{7}$ of $21 = 3$, and so on.

8. Which is greater, $\frac{1}{7}$ of a cake or $\frac{1}{6}$ of a cake?

9. Which is greater, $\frac{1}{7}$ of 42 or $\frac{1}{6}$ of 42?

Find the following. Practice these exercises frequently, as they are especially difficult:

10.	$48 \div 6$	$42 \div 6$	$\frac{1}{5}$ of 45	$\frac{1}{7}$ of 56
11.	$49 \div 7$	$45 \div 5$	$\frac{1}{6}$ of 42	$\frac{1}{6}$ of 48
12.	$63 \div 7$	$56 \div 7$	$\frac{1}{7}$ of 63	$\frac{1}{7}$ of 49
13.	$42 \div 7$	$54 \div 6$	$\frac{1}{7}$ of 42	$\frac{1}{6}$ of 54

USING THE TABLES OF 7's

Practice until you can multiply and check 12 *of the following examples in* 4 *minutes (after copying):*

1. 31 × 7	10. 81 × 7	19. 13 × 7	28. 53 × 7	37. 92 × 7	46. 58 × 7
2. 16 × 7	11. 47 × 7	20. 29 × 7	29. 60 × 7	38. 74 × 7	47. 91 × 7
3. 27 × 7	12. 89 × 7	21. 72 × 7	30. 14 × 7	39. 50 × 7	48. 56 × 7
4. 57 × 7	13. 70 × 7	22. 17 × 7	31. 73 × 7	40. 76 × 7	49. 67 × 7
5. 70 × 6	14. 71 × 5	23. 76 × 4	32. 97 × 3	41. 71 × 6	50. 79 × 5
6. 71 × 8	15. 37 × 9	24. 75 × 8	33. 90 × 7	42. 17 × 9	51. 79 × 6
7. 70 × 9	16. 37 × 8	25. 77 × 4	34. 75 × 9	43. 30 × 7	52. 67 × 8
8. 74 × 5	17. 67 × 9	26. 76 × 6	35. 78 × 3	44. 27 × 9	53. 40 × 7
9. 59 × 7	18. 32 × 7	27. 52 × 7	36. 47 × 4	45. 67 × 5	54. 99 × 7

HOW MANY TIMES DOES THE CLOCK STRIKE?

1. The bell in the village clock strikes 156 times a day. How many times does it strike in a week?

2. Uncle Rob has a clock that strikes each quarter hour. In a day it strikes 228 times. How many times does it strike in a week?

3. Mrs. Burton has a clock with Westminster chimes, which strikes 1116 times each day. How many times does it strike in a week?

4. Mary has a clock that strikes 300 times a day and another that strikes 444 times a day. How many times does each clock strike in a week?

Multiply and check:

5. 930 × 7	**10.** 218 × 7	**15.** 634 × 7	**20.** \$2.95 × 7	**25.** \$7.81 × 7
6. 784 × 7	**11.** 632 × 7	**16.** 787 × 7	**21.** \$4.52 × 7	**26.** \$3.90 × 7
7. 673 × 7	**12.** 854 × 7	**17.** 108 × 7	**22.** \$2.44 × 7	**27.** \$6.05 × 7
8. 156 × 7	**13.** 307 × 7	**18.** 801 × 7	**23.** \$9.02 × 7	**28.** \$5.69 × 7
9. 127 × 8	**14.** 737 × 5	**19.** 170 × 4	**24.** \$7.00 × 3	**29.** \$1.07 × 9

30. Now multiply by 3 instead of by 7 in ex. 5 to 8.

31. Multiply by 6 instead of by 7 in ex. 20 to 23.

PREPARING FOR SHORT DIVISION BY 7

Subtract at sight:

Think "35 and what are 40?"

1.	40	31	62	20	41	30	61	53
	35	28	56	14	35	28	56	49
2.	32	60	55	51	34	52	54	33
	28	56	49	49	28	49	49	28

Practice the above examples carefully, because you will need to use them in working the division problems below.

Divide mentally. Give only quotients and remainders. Practice until you can do ex. 3 *to* 10 *in* 3 *minutes:*

3.	7)40	7)17	7)22	7)58	7)64	7)11	7)9
4.	7)57	7)41	7)2	7)12	7)10	7)48	7)38
5.	7)6	7)3	7)20	7)18	7)43	7)60	7)44
6.	7)13	7)27	7)50	7)30	7)45	7)61	7)55
7.	7)37	7)19	7)0	7)69	7)46	7)25	7)62
8.	7)68	7)8	7)54	7)1	7)52	7)34	7)33
9.	7)39	7)66	7)16	7)5	7)24	7)26	7)67
10.	7)53	7)65	7)51	7)47	7)31	7)4	7)32

11. Mildred and her mother went on a European tour which took 54 days. How many weeks and days was that?

BUYING SUPPLIES FOR THE BASEBALL TEAM

1. The Monroe Baseball Team bought 7 new suits for $57.05. How much did each suit cost?

Divide dollars and cents just as you divide other numbers. Then place the decimal point before the last two figures in the quotient to separate the dollars from the cents. This brings the decimal point in the quotient right below the decimal point in the dividend.

$$7\overline{)\$57.05}\quad \$\ 8.15$$

You see that each suit cost $8.15.

2. The team bought 7 new pairs of athletic shoes for $19.95. Find how much each pair of shoes cost.

3. They paid $6.20 for 5 baseballs. What was the cost of each ball?

4. The team also bought 4 bats for $6.84. How much did 1 bat cost?

5. For 3 pairs of athletic stockings the team paid $1.77. What was the cost of 1 pair?

Divide the following. Check by multiplying:

6. $7\overline{)\$280}$	**12.** $6\overline{)\$2.22}$	**18.** $4\overline{)\$60.00}$	**24.** $7\overline{)\$216.44}$
7. $7\overline{)\$364}$	**13.** $7\overline{)\$9.03}$	**19.** $2\overline{)\$33.00}$	**25.** $5\overline{)\$360.50}$
8. $7\overline{)\$868}$	**14.** $7\overline{)\$7.42}$	**20.** $3\overline{)\$41.52}$	**26.** $2\overline{)\$112.14}$
9. $7\overline{)\$945}$	**15.** $5\overline{)\$9.95}$	**21.** $6\overline{)\$52.86}$	**27.** $7\overline{)\$110.88}$
10. $7\overline{)\$686}$	**16.** $6\overline{)\$6.18}$	**22.** $5\overline{)\$25.05}$	**28.** $6\overline{)\$265.38}$
11. $7\overline{)\$721}$	**17.** $7\overline{)\$3.43}$	**23.** $4\overline{)\$11.72}$	**29.** $7\overline{)\$364.07}$

FINDING REMAINDERS IN DIVISION

In the gymnasium 208 boys are going to march by 7's. How many rows will they make?

Think "$20 \div 7 = 2$, with 6 over." Write 2 under 0.

Think of 6 as written before 8, making 68. Then think "$68 \div 7 = 9$, with 5 over." Write 9 under 8.

Write 5 after the letter R, which stands for *remainder*.

There will be 29 rows and 5 boys left over.

Check the work by multiplying 29 by 7, which gives 203. Then add the remainder, 5, which makes 208. Since 208 is the same as the dividend, the work is considered right.

$$7\overline{)208}$$

$$29\ R\ 5$$

Check

$$\begin{array}{r} 29 \\ \times\ 7 \\ \hline 203 \\ +\ 5\ R \\ \hline 208 \end{array}$$

In checking division with a remainder, multiply the quotient by the divisor and add the remainder. If the result equals the dividend, the work is right.

Exercises

Find the quotients and the remainders. Check the work:

1. $2\overline{)517}$	7. $5\overline{)392}$	13. $7\overline{)428}$	19. $5\overline{)\$4.32}$
2. $3\overline{)652}$	8. $3\overline{)719}$	14. $6\overline{)619}$	20. $4\overline{)\$1.54}$
3. $7\overline{)717}$	9. $4\overline{)298}$	15. $4\overline{)562}$	21. $7\overline{)\$8.52}$
4. $4\overline{)327}$	10. $5\overline{)419}$	16. $6\overline{)327}$	22. $3\overline{)\$6.95}$
5. $6\overline{)263}$	11. $7\overline{)626}$	17. $7\overline{)484}$	23. $7\overline{)\$8.95}$
6. $3\overline{)751}$	12. $7\overline{)929}$	18. $6\overline{)257}$	24. $4\overline{)\$3.78}$

RENTING A BOAT

At Elk Lake you can rent a rowboat for \$8.40 a month and a sailboat for \$5.25 a day.

1. Four boys rent a rowboat together for a month. How much does it cost each boy? If 2 more boys join them, how much must each of the 6 boys pay?

2. If Ed joins the 6 other boys and shares in the expense of renting the boat, how much must each boy pay?

3. Five boys rent a sailboat for 6 days at \$5.25 a day. How much must they pay in all? What is each boy's share of the expense?

4. If 6 boys divide an expense of \$5.25, how many of them will pay \$.87? How many will pay \$.88?

Divide each of the following by 7, finding the quotients and the remainders, if any. Check the work:

5.	448	**10.**	406	**15.**	2436	**20.**	\$8.19	**25.**	\$9.38
6.	896	**11.**	442	**16.**	4515	**21.**	\$9.24	**26.**	\$7.21
7.	328	**12.**	555	**17.**	6594	**22.**	\$3.78	**27.**	\$5.04
8.	611	**13.**	600	**18.**	2150	**23.**	\$4.83	**28.**	\$8.64
9.	922	**14.**	693	**19.**	3229	**24.**	\$7.56	**29.**	\$5.14

WEEKS AND DAYS

NOVEMBER

SUN.	MON.	TUE.	WED	THU.	FRI.	SAT.
First Qr. 2nd	Full Moon 9th	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	Last Qr. 16th	New Moon 24th	..

DECEMBER

SUN.	MON	TUE.	WED.	THU.	FRI.	SAT.
First Qr. 1st—31st	Full Moon 8th	Last Qr. 15th	New Moon 23rd	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1. Name all the months of the year.

2. What words do Sun., Mon., Tue., Wed., Thu., Fri., and Sat. stand for on the calendar?

3. How many days are there in 1 week? in 2 weeks? in 3 weeks? in 4 weeks? in 5 weeks?

4. How many days are there in November? in December?

5. How many days more than 4 weeks are there in November? in December?

6. Learn this table of *time:*

7 days (da.) = 1 week (wk.)
4 weeks = about 1 month (mo.)
12 months = 1 year (yr.)

Tell what numbers should be put in place of the dots:

7. 6 wk. = . . . da.

8. 8 wk. = . . . da.

9. 4 wk. = . . . da.

10. 9 da. = . . . wk. and . . . da.

11. 30 da. = . . . wk. and . . . da.

12. 45 da. = . . . wk. and . . . da.

COUNTING WEEKS AND DAYS

In ex. 1, 5, *and* 6, *use the calendar on page* 152.

1. On what date does the first Tuesday in November come? the second Tuesday? the third Tuesday?

2. When you know the date of the first Sunday in November, how can you tell the dates of the other Sundays in that month without looking at the calendar?

3. The first Saturday in December is December 3. Without looking at the calendar, tell the dates for the second, third, and fourth Saturdays.

4. Count by 7's from 0 to 28; from 1 to 29; from 2 to 30; from 3 to 31; from 4 to 25; from 5 to 26.

5. What date on the calendar is the fifth Friday in December?

6. Suppose that it is now November 20. How many weeks is it before Christmas Day?

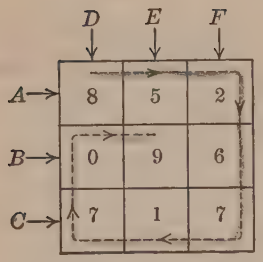
7. Jack was ill from November 4 until November 19. How many days was he ill? (Subtract 4 from 19 without looking at the calendar.)

8. Roy lives in Chicago. On July 27 he received the following two letters. How many days did it take each letter to reach him?

(*a*) The first came from France and was postmarked July 15.

(*b*) The second came from China and was postmarked July 3.

MAKING MAGIC SQUARES



This figure is a kind of magic square. Let us study it.

Add the numbers in Row A thus: $8 + 5 + 2 = 15$.

Find the sum of Row B; of Row C. Then add Column D thus: $8 + 0 + 7$. Also add Columns E and F. *Notice that each row and each column has the same sum.*

To make this magic square, Ted and Joan first decide that the sum should always be 15. Joan starts Row A by writing any number, like 8. Ted now writes any number, like 5; Joan thinks "$8 + 5 = 13$, $13 + 2 = 15$," and writes 2.

Now, following the dotted line, Joan writes 6 under 2. Then Ted thinks "$6 + 2 = 8$, $8 + 7 = 15$" and writes 7 under 6. Is the sum of Column F now 15?

Ted writes 1 to the left of 7. Joan thinks "$7 + 1 = 8$, $8 + 7 = 15$" and writes 7 to the left of 1. Joan now completes Column D by writing 0 above 7. How does Ted complete Row B?

Play this game. Start with sums from 10 to 22, using one-figure numbers in each space. Then try larger sums, using some two-figure numbers, as here.

9	6	15
12	6	12
9	18	3

The sum of the first two numbers in any row or column must never be greater than the desired sum.

REVIEW OF ADDITION AND SUBTRACTION

Add without copying, and check the work:

1.	2.	3.	4.	5.	6.
67	70	57	31	83	24
83	36	10	95	22	80
44	97	45	47	96	41
46	69	85	18	57	69
59	32	86	89	69	59

7.	8.	9.	10.	11.	12.
24	68	86	61	71	89
98	29	63	25	76	33
10	77	53	70	80	42
52	52	79	53	71	95
39	10	49	29	62	80
37	43	10	58	88	65

Copy and subtract the following. Check the work:

13.	14.	15.	16.
\$81.45	\$93.64	\$50.00	\$95.12
23.68	43.97	12.91	14.83

17.	18.	19.	20.
\$72.73	\$69.02	\$81.28	\$63.01
3.95	38.78	15.29	5.71

21.	22.	23.	24.
\$94.50	\$95.50	\$70.00	\$51.73
23.61	39.60	13.74	8.64

25.	26.	27.	28.
\$80.05	\$92.67	\$42.10	\$94.52
61.96	25.78	37.60	30.86

MULTIPLYING AND DIVIDING BY 8

1. How many are three 8's? seven 8's? nine 8's?

2. How many 8's are there in 32? in 56? in 72?

3. Make multiplication and division tables for 8's, as on page 132 for 6's. Compare with those below.

4. Remember these tables:

$1\times8=8$	$6\times8=48$	$8\div8=1$	$48\div8=6$
$2\times8=16$	$7\times8=56$	$16\div8=2$	$56\div8=7$
$3\times8=24$	$8\times8=64$	$24\div8=3$	$64\div8=8$
$4\times8=32$	$9\times8=72$	$32\div8=4$	$72\div8=9$
$5\times8=40$	$10\times8=80$	$40\div8=5$	$80\div8=10$

5. Memorize: $8\times0=0$ $\quad 0\times8=0$ $\quad 0\div8=0$

Multiply as rapidly as you can:

6.

8	8	2	8	8	6	9	8	8	10
2	0	8	8	1	8	8	3	9	8

7.

8	8	0	7	5	8	4	3	8	1
7	4	8	8	8	6	8	8	5	8

Divide the following at sight:

8. $8\overline{)56}$ $\quad 8\overline{)0}$ $\quad 8\overline{)72}$ $\quad 8\overline{)32}$ $\quad 8\overline{)48}$ $\quad 8\overline{)64}$ $\quad 8\overline{)24}$ $\quad 8\overline{)40}$

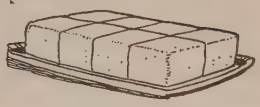
Multiply the following at sight:

9. 6×8 $\quad 8\times6$ $\quad 9\times8$ $\quad 8\times9$

10. 5×8 $\quad 8\times5$ $\quad 7\times8$ $\quad 8\times7$

11. Write the 8's table in another way, like this: $8\times1=8$, $\quad 8\times2=16$, $\quad 8\times3=24$, and so on.

LEARNING ABOUT $\frac{1}{8}$



1. This cake is divided into 8 equal pieces. What part of the whole cake is each piece?

2. Divide 24 apples into 8 equal groups. What do you call each group?

3. When one thing or a group of things is divided into 8 equal parts, each part is called *one eighth*, or $\frac{1}{8}$, of the whole.

To find $\frac{1}{8}$ of a number, divide it by 8.

4. How many are $\frac{1}{8}$ of 24 apples? $\frac{1}{8}$ of 32 walnuts?

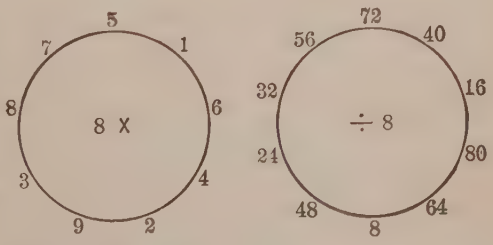
5. How many eighths of an orange are there in a whole orange?

6. Find $\frac{1}{8}$ of these numbers: 56, 72, 40, 16, 64, 8.

Using 8's

1. Multiply each number on the first circle by 8 and add 6 to each product. Repeat, adding 5 to each product.

2. Divide each number on the second circle by 8.



3. How many gallons are there in 72 pt. of milk?

4. At 8¢ each, tell the cost of the following:

9 balls 8 oranges 7 dolls 6 doll caps

USING THE TABLES OF 8's

Practice until you can multiply and check 12 *of the following examples in* 4 *minutes (after copying):*

1. 21 × 8	9. 71 × 8	17. 12 × 8	25. 53 × 8	33. 75 × 8	41. 88 × 8
2. 13 × 8	10. 69 × 8	18. 45 × 8	26. 90 × 8	34. 64 × 8	42. 27 × 8
3. 15 × 8	11. 36 × 8	19. 94 × 8	27. 38 × 8	35. 62 × 8	43. 78 × 8
4. 14 × 8	12. 92 × 8	20. 37 × 8	28. 58 × 8	36. 60 × 8	44. 49 × 8
5. 81 × 6	13. 85 × 6	21. 58 × 7	29. 86 × 5	37. 18 × 4	45. 28 × 3
6. 88 × 5	14. 28 × 6	22. 87 × 7	30. 68 × 3	38. 68 × 5	46. 84 × 4
7. 88 × 4	15. 83 × 7	23. 80 × 4	31. 86 × 7	39. 68 × 7	47. 82 × 8
8. 85 × 4	16. 28 × 5	24. 87 × 4	32. 86 × 6	40. 87 × 3	48. 83 × 3

NOTE. If preferred, the above examples may be worked without copying, the answers being written on folded paper.

PREPARING FOR SHORT DIVISION BY 8

Subtract at sight:

Think "24 and what are 30?"

1.	30	23	60	51	20	63	70	55	61
	24	16	56	48	16	56	64	48	56
2.	50	21	31	71	52	22	54	62	53
	48	16	24	64	48	16	48	56	48

Divide each of the following numbers by 8 orally, giving only the quotient and the remainder. Practice until you can do ex. 3 to 9 in 4 minutes:

3.	30	7	28	5	9	36	47	0	41	17
4.	23	42	39	20	10	1	55	63	46	15
5.	26	18	69	35	59	4	14	25	37	60
6.	74	50	51	49	27	76	75	54	29	11
7.	58	61	19	13	77	44	68	43	3	22
8.	73	45	33	57	53	71	12	78	38	52
9.	67	62	21	31	79	2	65	70	66	34

10. Ralph has 75¢. How many oranges can he buy at 8¢ each and how much change will he receive?

11. Elizabeth has 60 pieces of candy which she is wrapping in packages to sell at the fair. She puts 8 pieces in each package. How many packages can she make? Will there be any pieces left over?

BUYING RAILROAD TICKETS

1. Tickets to the Girl Scouts' Camp cost 67¢ each. How much will 8 tickets cost?

2. Tickets for 8 boys to Echo Lake cost $9.04. How much did each ticket cost?

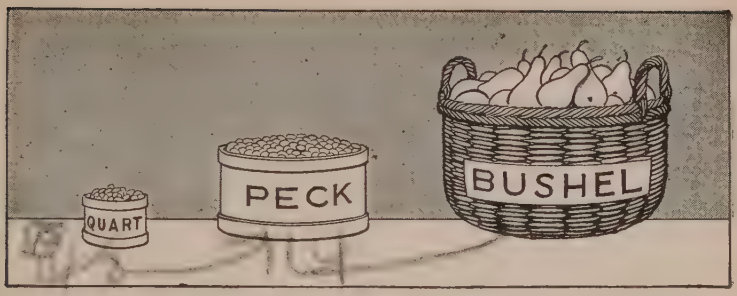
3. Mr. Gray paid $17.20 for 8 railroad tickets to take his friends to visit his farm. How much did each ticket cost?

Multiply. Check by going over the work again:

4. 156 × 8	7. 874 × 8	10. 392 × 8	13. $3.78 × 8	16. $4.09 × 8
5. 257 × 8	8. 466 × 8	11. 918 × 8	14. $5.12 × 8	17. $8.09 × 8
6. 307 × 8	9. 605 × 8	12. 482 × 8	15. $5.03 × 8	18. $6.74 × 8

Divide the following. Check the work by multiplying:

19. 8)808	26. 8)864	33. 8)$16.08	40. 8)$10.48
20. 8)816	27. 8)960	34. 8)$75.92	41. 8)$11.20
21. 8)824	28. 8)120	35. 8)$87.10	42. 8)$26.48
22. 8)840	29. 8)136	36. 8)$16.48	43. 8)$33.65
23. 8)832	30. 8)170	37. 8)$36.50	44. 8)$40.03
24. 8)856	31. 8)200	38. 8)$65.39	45. 8)$10.00
25. 8)872	32. 8)695	39. 8)$41.92	46. 8)$73.75



QUARTS AND PECKS

Vegetables, fruits, grains, and seed are often measured by dry measure.

Learn this table of *dry measure:*

2 pints (pt.) = 1 quart (qt.)
8 quarts (qt.) = 1 peck (pk.)
4 pecks (pk.) = 1 bushel (bu.)

1. Jack's mother bought 1 pk. of potatoes. How many quarts was that? what part of a bushel?

2. Mr. Jones bought a 2-bushel bag of oats. How many quarts of oats were there in the bag?

3. Henry sold 8 pk. of tomatoes from his garden at 5¢ a quart. How much did he get for them?

4. Mr. Harris got 26 bu. of peaches from his trees. How many peck baskets would these peaches fill?

5. Paul gathered 16 qt. of nuts. How many pecks was that? How many pecks would 24 qt. make?

6. Mrs. White bought a peck of potatoes for 51¢. Find the cost of a bushel at this rate.

POUNDS AND OUNCES

1. Doris is buying a pound of sugar. The grocer puts a pound weight on the scales. When he puts one pound of sugar in the bag, the scales will balance.

2. Name other things that are sold by the pound.

3. When we buy a small quantity of anything, like spice or pepper, it is weighed by the ounce.

16 ounces (oz.) = 1 pound (lb.)

4. How many ounces are there in $\frac{1}{2}$ lb.? in $\frac{1}{4}$ lb.? in $\frac{1}{8}$ lb.? in 2 lb.? in 3 lb.?

5. Doris asked for $\frac{1}{2}$ lb. of butter. The clerk gave her 9 oz. Was this too much or too little?

6. Mary found that she could buy a 4-ounce jar of salted nuts for 36¢ or a 6-ounce jar for 48¢. She bought the larger jar. How much did she save on each ounce?

7. Mr. Davis makes Star Baking Powder. Each 6-pound bag of baking powder will fill how many 4-ounce cans? how many 8-ounce cans?

8. Weigh yourself on a scale. How much do you weigh? Which child in your class weighs the most? the least?

MULTIPLYING AND DIVIDING BY 9

1. How many are three 9's? seven 9's? nine 9's?

2. How many 9's are there in 27? in 54? in 72?

3. Make multiplication and division tables for 9's, as on page 132 for 6's. Compare with those below.

4. Remember these tables:

$1 \times 9 = 9$	$6 \times 9 = 54$	$9 \div 9 = 1$	$54 \div 9 = 6$
$2 \times 9 = 18$	$7 \times 9 = 63$	$18 \div 9 = 2$	$63 \div 9 = 7$
$3 \times 9 = 27$	$8 \times 9 = 72$	$27 \div 9 = 3$	$72 \div 9 = 8$
$4 \times 9 = 36$	$9 \times 9 = 81$	$36 \div 9 = 4$	$81 \div 9 = 9$
$5 \times 9 = 45$	$10 \times 9 = 90$	$45 \div 9 = 5$	$90 \div 9 = 10$

5. Remember: $\mathbf{9 \times 0 = 0}$ $\mathbf{0 \times 9 = 0}$ $\mathbf{0 \div 9 = 0}$

Multiply as rapidly as you can:

6.

9	9	2	9	9	6	8	9	9	10
2	0	9	9	1	9	9	3	8	9

7.

9	9	0	7	5	9	4	3	9	1
7	4	9	9	9	6	9	9	5	9

Divide the following at sight:

8. $9)\underline{72}$ $9)\underline{0}$ $9)\underline{45}$ $9)\underline{63}$ $9)\underline{81}$ $9)\underline{54}$ $9)\underline{27}$

Multiply the following at sight:

9. 9×7 7×9 9×8 8×9

10. Write the 9's table in another way, like this: $9 \times 1 = 9$, $9 \times 2 = 18$, $9 \times 3 = 27$, and so on.

LEARNING ABOUT $\frac{1}{9}$

1. Draw a line 9 inches long and divide it into 9 equal parts. Each part is *one ninth* of the line. How many ninths are there in a whole line?

2. Make 72 stars and divide them into 9 equal groups. Each group is *one ninth* of all the stars.

3. When one thing or a group of things is divided into 9 equal parts, each part is called *one ninth*, or $\frac{1}{9}$, of the whole.

To find $\frac{1}{9}$ of a number, divide it by 9.

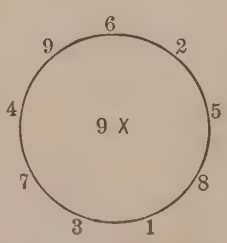
4. Find $\frac{1}{9}$ of these numbers: 27, 72, 81, 63, 18.

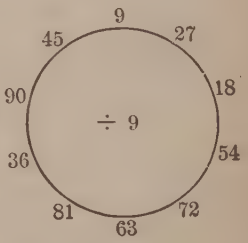
5. Find $\frac{1}{9}$ of 54. Find $\frac{1}{6}$ of 54. Which is larger?

Using 9's

1. Multiply each number on the first circle by 9 and add 8 to each product. Repeat, adding 7 to each product. Repeat, adding 6.

2. Divide each number on the second circle by 9.





3. How many inches make a yard? How many armbands, each 9 in. long, can the girls of our basketball team make from 1 yd. of ribbon?

4. Count by 9's to 81, beginning with 9; to 82, beginning with 1; to 83, beginning with 2.

USING THE TABLES

Practice until you can multiply and check 12 *of the following examples in* 4 *minutes* (*after copying*) :

1. 41 × 9	9. 61 × 9	17. 32 × 9	25. 57 × 9	33. 28 × 9	41. 89 × 9
2. 42 × 9	10. 58 × 9	18. 90 × 9	26. 56 × 9	34. 37 × 9	42. 71 × 9
3. 16 × 9	11. 93 × 9	19. 74 × 9	27. 45 × 9	35. 29 × 9	43. 83 × 9
4. 12 × 9	12. 51 × 9	20. 75 × 9	28. 39 × 9	36. 40 × 9	44. 23 × 9
5. 91 × 8	13. 29 × 6	21. 94 × 5	29. 90 × 4	37. 69 × 3	45. 94 × 7
6. 95 × 8	14. 96 × 6	22. 97 × 4	30. 19 × 8	38. 79 × 8	46. 71 × 9
7. 93 × 5	15. 80 × 8	23. 95 × 6	31. 19 × 4	39. 97 × 3	47. 49 × 6
8. 99 × 8	16. 69 × 7	24. 49 × 2	32. 95 × 5	40. 59 × 4	48. 90 × 8

PREPARING FOR SHORT DIVISION BY 9

Subtract at sight:

Think "18 and what are 26?"

1.	26	40	35	50	80	60	51	20	31
	18	36	27	45	72	54	45	18	27
2.	44	70	61	52	21	25	32	41	71
	36	63	54	45	18	18	27	36	63
3.	30	62	53	22	34	42	43	33	24
	27	54	45	18	27	36	36	27	18

Divide each of the following numbers by 9 *at sight, giving only the quotient and the remainder. Practice until you can do ex.* 4 *to* 11 *in* 5 *minutes:*

4.	26	31	49	8	17	44	60	89	53	23
5.	5	64	80	11	12	30	16	19	33	41
6.	47	29	4	22	15	58	40	59	34	39
7.	32	57	76	20	25	3	14	50	6	73
8.	82	69	2	35	68	67	28	55	24	1
9.	13	75	42	61	46	71	86	70	83	21
10.	79	48	7	88	0	84	87	43	62	51
11.	77	85	56	65	52	74	66	38	78	37

12. Our baseball team has bought a new ball for 70¢. If the 9 boys on the team share the expense, how many boys must pay 7¢? How many must pay 8¢?

SAVING FOR SUMMER VACATION

1. Joseph has saved $166.50. He wants to go to camp for 9 weeks. How much can he afford to spend each week?

2. Rose is going to a camp which costs $12.50 a week. How much will it cost for 9 weeks?

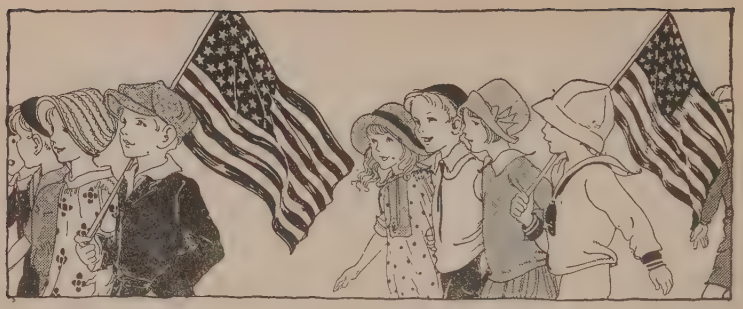
3. Bernard wants to go to Europe in 9 months. He will need about $495. How much must he save each month in order to have enough for the trip?

Divide the following. Check the work by multiplying:

4. 9)909	10. 9)931	16. 9)270	22. 9)$48.50
5. 9)117	11. 9)477	17. 9)981	23. 9)$28.80
6. 9)216	12. 9)531	18. 9)451	24. 9)$81.72
7. 9)315	13. 9)266	19. 9)762	25. 9)$19.17
8. 9)515	14. 9)354	20. 9)846	26. 9)$54.09
9. 9)408	15. 9)198	21. 9)567	27. 9)$60.50

Multiply. Check the work by going over it again:

28. 115 × 9	31. 721 × 9	34. 522 × 9	37. $1.25 × 9	40. $2.37 × 9
29. 239 × 9	32. 460 × 9	35. 183 × 9	38. $2.83 × 9	41. $6.07 × 9
30. 469 × 9	33. 358 × 9	36. 266 × 9	39. $3.67 × 9	42. $5.90 × 9



MARCHING IN THE PARADE

Next Saturday 144 children from our school will be in a parade. They are deciding how they will march.

1. Joe thinks that it would look best to march by 4's. How many rows would that make?

2. Ida says that they should march by 8's. How many rows would that make?

3. If they march by 3's, how many rows would that make? Would any children be left over?

4. Mary says that they would have a longer line if they marched by 2's. How many rows would they have then? Would any child be left over?

5. Adele wants to march by 6's or by 9's. Could they use all the children either way?

6. How many rows will there be, and how many children left over, if they march by 5's? by 7's?

7. They decide to march by 4's. Joe wants to buy enough flags so that each row can carry one flag. At 9¢ each, how much will the flags cost all together?

SOME TRICKS WITH NUMBERS

Uncle Joe is going to show you some interesting tricks with numbers. Do just as he tells you.

1. Multiply 115 by 9, but don't tell Uncle Joe the answer.

2. Now watch Uncle Joe do his trick. First he multiplies 115 by 3, which gives 345; then he multiplies 345 by 3. Does Uncle Joe get the same answer that you did when you multiplied by 9?

$$\begin{array}{r} 115 \\ \times\ 3 \\ \hline 345 \\ \times\ 3 \\ \hline 1035 \end{array}$$

3. Try Uncle Joe's trick on these numbers. Then multiply each number by 9. Do you get the same answer both ways?

217 118 245 267 158 230

This trick looks like magic, doesn't it? Uncle Joe says that the reason it works is because $3 \times 3 = 9$.

4. Now Uncle Joe will show you another trick. Multiply 235 by 6, but do not tell him the answer yet.

5. Now do as Uncle Joe tells you. First multiply 235 by 2 and then multiply the answer by 3, as shown here. You get the same answer that you did when you multiplied by 6 because $2 \times 3 = 6$.

$$\begin{array}{r} 235 \\ \times\ 2 \\ \hline 470 \\ \times\ 3 \\ \hline 1410 \end{array}$$

6. Try Uncle Joe's trick on these numbers. Then multiply each number by 6. Do you get the same answer both ways?

239 157 349 168 451 277

SOME MORE TRICKS

Multiply each of the following by 9. *Check your answer by using Uncle Joe's trick for multiplying by* 9:

1. 962	**4.** 847	**7.** 502	**10.** 136	**13.** 472
2. 514	**5.** 307	**8.** 983	**11.** 329	**14.** 406
3. 653	**6.** 903	**9.** 178	**12.** 285	**15.** 705

16. Multiply 173 by 4. Can you make a trick like Uncle Joe's which will give you the same answer in another way? Can you tell why your trick works?

17. Try the trick in ex. 16 on these numbers. Then see if you get the same answer when you multiply by 4:

129 358 106 346 327 439

18. Make up a trick for multiplying a number by 8.

19. Uncle Joe has this trick for dividing by 9:

First divide 225 by 3, which gives 75, as shown here. Then divide 75 by 3, which gives 25.

$$\begin{array}{r} 3\overline{)225} \\ 3\overline{)75} \\ 25 \end{array}$$

Now divide 225 by 9. How does your answer agree with the one you got when you divided first by 3 and then again by 3?

Divide each of the following by 9. *Then see if you get the same answer by using the trick given in ex.* 19:

20. 927	**22.** 954	**24.** 783	**26.** 1809	**28.** 3051
21. 288	**23.** 351	**25.** 738	**27.** 3546	**29.** 1017

THE 100 MULTIPLICATION COMBINATIONS

Practice until you can multiply all of these orally in 3 minutes. The last four rows are the hardest:

1.	1	2	6	9	3	2	2	1	6	2
	2	0	2	0	6	1	9	0	0	6
2.	2	6	1	9	0	5	0	2	1	5
	2	1	1	1	2	1	1	3	3	2
3.	5	4	0	8	9	4	8	3	3	8
	0	1	4	0	2	5	2	4	5	1
4.	1	0	5	3	0	5	1	2	0	4
	5	3	3	3	9	4	4	8	6	2
5.	1	2	3	0	1	4	5	0	7	0
	6	4	1	5	9	3	5	8	2	7
6.	3	7	1	1	4	2	4	7	3	2
	2	0	7	8	4	7	0	1	0	5
7.	5	4	5	4	8	8	3	6	6	7
	7	6	8	8	3	4	8	6	3	5
8.	6	5	3	7	9	3	4	0	6	7
	5	6	9	3	3	7	7	0	4	4
9.	8	4	7	8	9	9	9	8	7	9
	8	9	7	5	4	5	9	9	8	7
10.	7	9	9	6	5	7	8	6	8	6
	6	6	8	7	9	9	7	8	6	9

MULTIPLICATION AND DIVISION

1. Mr. Brown is buying railroad tickets for 6 people. At $2.76 each, how much do the tickets cost him?

2. How many rooms are there in a 7-story apartment house which has 33 rooms on each floor?

3. A rural baker travels 42 miles each day to cover his route. How many miles does he travel in 8 days?

4. Mr. Smith's delivery car traveled 1890 miles last month. How many gallons of gasoline did he use if the car goes 7 miles on 1 gallon?

5. 48 pupils were divided into groups of 5 to play a game. How many groups were there? Were any pupils left out?

6. Mrs. Harris lost a wrist watch that was worth $150. She offered $\frac{1}{5}$ of the value of the watch as a reward to the finder. How much was the reward?

7. Ida's 9 friends give $.75 each to buy her a birthday present. How much can they spend for it?

8. A farmer gets 128 quarts of milk from his cows. How many gallons is this?

9. Mrs. Wilson buys a sewing machine for $52.00. She agrees to pay for it by paying the same amount each month for the next 8 months. How much must she pay each month?

ADDITION AND SUBTRACTION

1. George can buy a Star bicycle for $27.50 or a Lion bicycle for $23.95. What is the difference between these two prices?

2. Mary has saved $16.00. Agnes has saved $7.13. How much more must Agnes save to have as much as Mary?

3. Tom had $27.63 before he went on his summer vacation, and $6.87 when he got back. How much did he spend while he was away?

Make change from $1.00 *for these amounts:*

4.	4¢	17¢	22¢	35¢	69¢	78¢
5.	8¢	28¢	41¢	83¢	91¢	49¢

Make change from $5.00 *for these amounts:*

6.	73¢	$1.15	$1.87	$2.25	$4.18
7.	24¢	$2.95	$3.99	$4.38	$2.01

Add the following and check the work:

8.	$4.67	**10.**	$2.29	**12.**	$1.70	**14.**	$4.95
	7.50		6.86		3.89		6.09
	3.98		9.71		6.68		2.75
	4.23		1.11		5.71		1.84
	2.39		3.66		3.44		4.67
9.	$9.23	**11.**	$9.09	**13.**	$6.39	**15.**	$4.69
	3.80		8.62		7.05		3.74
	9.13		8.75		.76		.75
	4.27		1.12		6.51		2.45
	1.57		1.96		3.66		3.89

DRILLS

1. Beginning with 1, count by 7's until you pass 70. Repeat, beginning with 2, 3, 4, 5, and 6 in turn.

2. Beginning with 1, count by 8's until you pass 80. Repeat, beginning with 2, 3, 4, 5, 6, and 7 in turn.

3. Beginning with 1, count by 9's until you pass 90. Repeat, beginning with 2, 3, 4, 5, 6, 7, and 8 in turn.

Copy and subtract the following. Check your work:

4. \$48.59 12.97	**7.** \$97.15 66.96	**10.** \$15.38 .99	**13.** \$36.60 7.58
5. \$52.77 16.98	**8.** \$80.00 37.45	**11.** \$37.10 19.28	**14.** \$69.77 23.89
6. \$43.29 5.58	**9.** \$95.38 16.45	**12.** \$70.00 12.53	**15.** \$62.80 28.99

Multiply the following and check your work:

16. 206 5	**18.** 182 5	**20.** 297 4	**22.** 517 6	**24.** 518 3
17. 450 3	**19.** 809 6	**21.** 721 9	**23.** 650 2	**25.** 625 7

Divide the following and check your work:

26. 2)700	**29.** 8)656	**32.** 4)904	**35.** 6)1456
27. 3)162	**30.** 4)839	**33.** 7)644	**36.** 7)1260
28. 5)475	**31.** 9)450	**34.** 5)205	**37.** 5)2020

CHAPTER IV

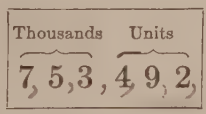
NUMBERS OF SIX FIGURES

1. You often see numbers of five and six figures in newspapers and magazines, on the license plates of automobiles, and in other places. You also need such numbers when you write the populations of any of the large cities.

2. This is the way large numbers are read:

40,000 is read *40 thousand.*
85,462 is read *85 thousand, 462.*
74,005 is read *74 thousand, 5.*
100,000 is read *100 thousand.*
253,897 is read *253 thousand, 897.*
900,100 is read *900 thousand, 100.*

3. You will find it easier to read a number having more than four figures if you put a comma between each group of three figures, counting from the right. Such groups are called **periods.** The first period, beginning at the right, is called the *units' period;* the second period is called the *thousands' period.*



4. Read each period in a large number as if it were a number by itself. Thus, the number 753,492 is read *753 thousand, 492.*

USING LARGE NUMBERS

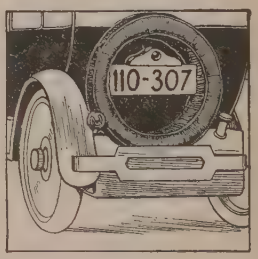
Read these sentences:

1. The president of the United States receives a salary of $75,000 a year.

2. It is 12,911 miles from New York to Hongkong, China, by way of the Panama Canal.

3. Last week one store sold $48,711.82 worth of household goods.

Read these automobile license numbers:



4.	75,328	430,097	800,000
5.	68,100	523,071	884,502
6.	94,060	703,090	700,911
7.	10,771	987,500	600,008

On automobile license plates a hyphen is often used instead of a comma, as in the picture. 110-307 may be read *one one o, three o seven*, zero being read like the letter *o*.

8. *Write the following numbers in figures:*

Sixty-seven thousand four hundred eight
Five hundred eight thousand one hundred nine
Two hundred eighty-nine thousand seven
Six hundred seven thousand five hundred one

9. What is the largest number that you can write with 4 figures? with 5 figures? with 6 figures? What is the smallest number that you can write with 4 figures? with 5 figures? with 6 figures?

AN ADDITION MATCH

The class is divided into two teams, the Reds and the Blues. These teams stand on opposite sides of the room, as in a spelling match. They have their books with them. The first Red does ex. 1 below at sight. The first Blue does ex. 2, and so on. If any one misses, he takes his seat and the next pupil on the other team does the example. The team with most pupils standing at the end wins.

Add the following:

1. 68 7	**5.** 57 4	**9.** 24 6	**13.** 49 7	**17.** 38 6	**21.** 66 8
2. 37 6	**6.** 27 8	**10.** 44 7	**14.** 46 7	**18.** 69 4	**22.** 37 5
3. 28 6	**7.** 58 5	**11.** 35 9	**15.** 66 9	**19.** 78 9	**23.** 87 9
4. 45 6	**8.** 55 7	**12.** 39 8	**16.** 63 7	**20.** 49 6	**24.** 35 8

Count as follows:

25. By 4's from 1 to 25. Thus, 1, 5, 9, and so on.

26. By 4's from 2 to 26.

27. By 5's from 2 to 32.

28. By 5's from 4 to 34.

29. By 6's from 1 to 37.

30. By 6's from 3 to 39.

31. By 7's from 2 to 44.

32. By 8's from 1 to 41.

33. By 9's from 1 to 46.

EXERCISES IN ADDITION

Add without copying, and check the work:

1.	2.	3.	4.	5.	6.	7.
7	6	6	4	3	8	5
0	4	2	5	8	1	6
6	8	7	7	0	6	1
3	5	4	0	7	5	5
4	6	9	2	9	9	6
5	5	4	7	6	9	7

8.	9.	10.	11.	12.	13.	14.
1	4	1	4	7	1	3
7	2	0	6	0	0	0
2	3	6	3	8	3	1
5	5	8	5	3	2	1
7	9	4	8	8	9	5
1	8	9	4	7	7	9

Copy and add these as rapidly as you can:

15.	16.	17.	18.
$311.73	$196.09	$712.54	$184.23
88.64	8.20	80.02	9.71
54.86	403.17	792.67	36.73
95.06	4.86	49.87	540.06
624.17	695.99	4.46	53.88

Add without copying. Practice until you can do and check these 5 examples in 7 minutes:

19.	20.	21.	22.	23.
283	170	422	190	126
485	869	824	345	540
920	374	812	131	999
761	705	369	377	915
659	448	687	544	108
344	153	294	633	625

ADDING LONG COLUMNS

Add the following and check the work:

1.	2.	3.	4.	5.	6.
80	54	85	81	40	93
66	12	26	20	44	71
75	79	56	49	14	46
98	70	30	60	22	32
13	85	99	75	85	24
76	19	17	59	65	73
34	69	39	27	79	59

7.	8.	9.	10.	11.	12.
21	39	58	96	55	58
95	92	89	77	94	24
93	68	13	60	58	85
12	10	70	65	63	60
30	49	27	86	20	74
88	12	15	37	17	84
57	83	34	92	86	38
64	48	18	68	98	15

Add without copying. Practice until you can do and check these 8 examples in 6 minutes:

13.	14.	15.	16.	17.	18.	19.	20.
4	9	7	6	4	7	3	3
9	8	1	3	4	6	2	6
7	7	4	5	8	2	6	7
3	2	5	2	8	9	5	2
0	6	0	9	1	4	0	1
4	2	6	4	6	0	8	0
6	4	1	3	0	9	7	5
3	0	9	6	9	2	3	4
7	4	0	3	1	8	9	9
6	9	7	8	8	8	3	5

HOW MUCH SHOULD YOU WEIGH?

How Much Boys Should Weigh

Height in Inches	Age				
	8 yr.	9 yr.	10 yr.	11 yr.	12 yr.
42	44				
43	46				
44	47		These numbers are pounds		
45	48	49			
46	50	51			
47	52	53	54		
48	55	55	56	57	
49	57	58	58	59	
50	59	60	60	61	62
51	61	62	63	64	65
52	63	64	65	67	68
53	66	67	68	69	70
54	69	70	71	72	73
55	..	73	74	75	76
56	..	77	78	79	80
57	..	..	81	82	83
58	..	..	84	85	86

How Much Girls Should Weigh

Height in Inches	Age				
	8 yr.	9 yr.	10 yr.	11 yr.	12 yr.
42	43				
43	44				
44	46		These numbers are pounds		
45	48	49			
46	50	51			
47	51	52	53		
48	53	54	55	56	
49	55	56	57	58	
50	57	58	59	60	61
51	60	61	62	63	64
52	63	64	65	66	67
53	66	67	68	68	69
54	68	69	70	71	72
55	..	72	73	74	75
56	..	76	77	78	79
57	..	..	81	82	83
58	..	..	85	86	87

To use these tables, you must know how old you are and how many inches tall you are. Then the table will tell you how many pounds you should weigh. If you are a boy 9 years old and 47 inches tall, the table tells you that you should weigh 53 pounds. If you are a girl 8 years old and 45 inches tall, the table tells you that you should weigh 48 pounds.

Find out how tall and how heavy you are. Are you overweight or underweight?

ARE THESE CHILDREN UNDERWEIGHT?

1. The teacher is finding how tall and how heavy the children of her class are. She writes the results in the chart below. Find the difference between each child's weight and the amount he should weigh according to the table on page 180.

2. Which of the children are underweight?

3. Which of the children are overweight?

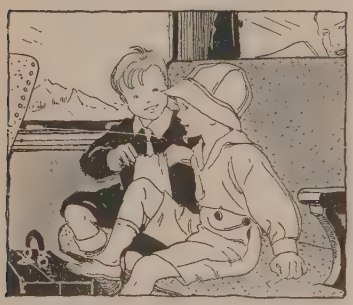
4. Is any child exactly the right weight?

Boys				
No.	Name	Age	Height	Weight
1	Abner	9	51	57
2	Billy	10	54	67
3	Dan	11	57	75
4	Edgar	10	54	64
5	Fred	10	51	67
6	Jerry	10	51	70
7	Jesse	9	52	73
8	Mark	9	46	51
9	Nat	9	51	59
10	Peter	8	50	65
11	Ralph	9	48	48
12	Rollo	10	48	60

Girls				
No.	Name	Age	Height	Weight
13	Anna	9	49	49
14	Betty	10	52	74
15	Clara	11	51	71
16	Doris	10	51	58
17	Grace	9	48	49
18	Helen	11	50	54
19	Ida	8	50	48
20	Julia	9	52	58
21	Maud	8	51	57
22	Nora	9	51	56
23	Polly	9	50	60
24	Susan	10	51	70

VACATION TRIPS

1. Fred went to Clear Lake. These were his expenses: Railroad fare, \$4.46; bus from station, \$.50; board, \$13.50; trips, \$.75; rowboat, \$2.75; bathing suit, \$1.25; sneakers, \$1.19. How much did the trip cost?



2. Tom visited his aunt. He paid \$12.74 for railroad fare, \$2.59 for a book for his aunt, \$3.75 for a tennis racket, \$.65 for candy, \$2.50 to rent a canoe, \$.79 for fishing tackle, and \$5.50 for a suit case. How much did his trip cost?

3. Alice went to camp for a week. She paid \$4.27 for railroad fare, \$15.00 for board, \$2.39 for a dress, \$3.39 for shoes, \$.55 for a knapsack, and \$.84 for a flashlight. How much did her trip cost?

4. Doris went to Bass Lake for a month. The first week she spent \$4.25; the second week, \$5.15; the third week, \$6.23; and the fourth week, \$5.35. How much did she spend in all?

5. Ray and Bob went camping. They paid \$14.75 for food, \$7.25 to rent a boat, \$2.75 for a sail, \$4.35 to rent a tent, and \$1.14 for a hatchet. Find the total cost of the trip. If the boys shared the expense equally, how much did each pay?

REVIEW OF SUBTRACTION

1. Review the 100 subtraction combinations on page 32 until you can give them all correctly in 2 minutes.

Show how a clerk would make change from 50¢ *for purchases of each of the following amounts:*

2. 33 28 17 36 15 38 46 31

3. 19 11 48 27 45 39 25 44

Subtract without copying. Practice until you can subtract and check 10 *examples correctly in* 5 *minutes:*

4. 623 266	**7.** 860 472	**10.** 820 680	**13.** 933 479	**16.** 856 648
5. 731 352	**8.** 630 506	**11.** 571 175	**14.** 727 199	**17.** 461 308
6. 464 268	**9.** 700 423	**12.** 689 490	**15.** 833 334	**18.** 924 417

Subtract without copying. Practice until you can subtract and check 10 *examples correctly in* 6 *minutes:*

19. 2841 1583	**22.** 7507 650	**25.** 5631 3544	**28.** 8533 5095
20. 8350 2651	**23.** 4602 842	**26.** 1953 97	**29.** 9645 7939
21. 5010 2387	**24.** 8458 1492	**27.** 3851 1776	**30.** 7005 2631

LARGER NUMBERS IN SUBTRACTION

A city had 43,568 inhabitants in a certain year and 70,002 inhabitants ten years later. How many inhabitants did it gain in the ten years?

Subtract by thinking as follows:
"8 + **4** = 12." Write 4, and carry 1.
"1 (carried) + 6 + **3** = 10." Write 3, and carry 1.
"1 (carried) + 5 + **4** = 10." Write 4, and carry 1.
"1 (carried) + 3 + **6** = 10." Write 6, and carry 1.
"1 (carried) + 4 + **2** = 7." Write 2. Check by adding up.
The city gained 26,434 inhabitants during the ten years.

70002	**Minuend**
43568	**Subtrahend**
26434	**Difference**

The number from which you subtract is called the **minuend.**

The number subtracted is called the **subtrahend.**

The answer is called the **difference** or **remainder.**

Exercises

1. A jeweler has a glass jar full of beads in his window, with a notice that he will give a string of beads to any one who guesses within 75 beads of the number in the jar. Clara guesses 1936 beads. Should she get the string if the jar contains 2005 beads?

2. Jack earned $148.50. He spent $87.75 for clothes, books, and a trip. How much had he left?

3. Mrs. Blake wanted a rug that cost $375.00. She waited and got it at a sale for $249.50. How much did she save by buying it at the sale?

SUBTRACTING LARGER NUMBERS

Copy, and subtract. Practice until you can do and check 8 examples in 6 minutes (after copying):

1. 50641 32462	**5.** 69563 16789	**9.** 81632 40676	**13.** 70000 53215
2. 97831 62889	**6.** 71497 44659	**10.** 52429 18830	**14.** 87514 47964
3. 86305 57510	**7.** 78370 32996	**11.** 73816 34098	**15.** 45111 30383
4. 46900 23591	**8.** 64320 17730	**12.** 75001 24302	**16.** 65401 46399

17. Anthony has $82.50 in the bank. If Sarah has $130.26, how much more has she than Anthony?

Subtract the following and check your work:

18. $507.21 143.54	**22.** $192.42 42.74	**26.** $830.53 633.85	**30.** $758.55 253.99
19. $373.24 195.75	**23.** $916.88 561.49	**27.** $824.91 570.33	**31.** $700.00 481.41
20. $751.35 265.42	**24.** $656.08 376.98	**28.** $724.83 580.96	**32.** $936.57 98.71
21. $628.41 67.98	**25.** $511.10 323.90	**29.** $808.73 58.78	**33.** $100.00 76.26

MULTIPLYING AND DIVIDING BY 10

1. Count by 10's to 100.
2. How many are three 10's? seven 10's?
3. How many 10's are there in 40? in 60? in 80?
4. Learn these tables:

$1 \times 10 = 10$	$6 \times 10 = 60$	$10 \div 10 = 1$	$60 \div 10 = 6$
$2 \times 10 = 20$	$7 \times 10 = 70$	$20 \div 10 = 2$	$70 \div 10 = 7$
$3 \times 10 = 30$	$8 \times 10 = 80$	$30 \div 10 = 3$	$80 \div 10 = 8$
$4 \times 10 = 40$	$9 \times 10 = 90$	$40 \div 10 = 4$	$90 \div 10 = 9$
$5 \times 10 = 50$	$10 \times 10 = 100$	$50 \div 10 = 5$	$100 \div 10 = 10$

5. *Multiply the following at sight:*

10	10	10	10	10	10	10	10	10
8	2	9	6	4	7	5	1	3

6. Write the 10's table in another way, like this $10 \times 1 = 10$, $10 \times 2 = 20$, and so on.

To multiply a number by 10, write a zero after it.

7. Find the cost of 10 pencils at 6¢ each.
8. How many 10-cent balls can you buy for 70¢?

Divide the following at sight:

9. $10\overline{)70}$ $10\overline{)40}$ $10\overline{)10}$ $10\overline{)30}$ $10\overline{)80}$ $10\overline{)50}$

Find $\frac{1}{10}$ of the following numbers:

10. 60 40 90 30 20 50 70 80 100 10

Multiply each of the following by 10:

11. 7 5 8 9 12 15 17 10 18 20

MULTIPLYING BY 10, 100, AND 1000

You learned on page 186 that you can multiply a number by 10 by writing a zero after it. Sometimes this is called *annexing* a zero.

To multiply a number by 10, annex a 0.

Multiply each of these numbers by 10:

1.	7	14	28	50	120	459	1732
2.	9	33	90	69	383	670	1450

You know that 6×100 equals 600. Hence 100×6 also equals 600, because 100×6 is the same as 6×100. Therefore you can multiply 6 by 100 by annexing 2 zeros to 6. In the same way, you can multiply 6 by 1000 by annexing 3 zeros to 6.

To multiply a number by 100, annex 2 zeros.
To multiply a number by 1000, annex 3 zeros.

Multiply each of these numbers by 100:

3.	49	70	685	430	948	1498	564

4. Multiply each number in ex. 3 by 1000.

Find the cost of each of the following:

5. 10 oranges at 9¢ each
6. 10 melons at 17¢ each
7. 100 pencils at 3¢ each
8. 100 hats at $2 each
9. 1000 stamps at 2¢ each
10. 100 qt. milk at 15¢ each

11. Find the number of cents in 10 dimes; in 10 nickels; in 10 quarters; in 10 half dollars; in 100 dimes; in 100 quarters.

MULTIPLYING BY NUMBERS THAT END IN ZEROS

1. To multiply by 30 is the same as to multiply by 3×10. Hence, to multiply by 30, multiply by 3 and annex a zero.

2. To multiply by 500 is the same as to multiply by 5×100. Hence, to multiply by 500, multiply by 5 and annex 2 zeros.

3. To multiply by 7000, multiply by 7 and annex 3 zeros.

4. Arrange the work like this, letting the zeros stand out at the right:

17	15	18	126	43
20	50	400	200	3000
340	750	7200	25200	129000

Exercises

Multiply. Check by going over the work again:

1. 18	**3.** 163	**5.** 178	**7.** 39
30	500	800	2000
2. 21	**4.** 275	**6.** 633	**8.** 52
90	200	400	7000

Multiply and check:

9. 30×45 **11.** 400×635 **13.** 9000×163

10. 60×58 **12.** 500×186 **14.** 8000×250

15. Mr. Reed bought 400 rocking horses at \$3.22 each. How much did he pay for them?

DIVIDING BY 10 AND 100

1. If you divide 60 by 10, you get 6. An easy way to get the same answer is to remove the 0 from 60.

2. If you divide 400 by 100, you get 4. Can you get the same answer by removing two 0's from 400?

By removing one 0 from the right of a number, you divide the number by 10.

By removing two 0's from the right of a number, you divide the number by 100.

3. How could you divide a number like 8000 by 10? by 100? by 1000?

Exercises

Divide each of the following by 10:

1.	60	170	230	580	1450	3900
2.	40	280	180	200	1600	2000

Divide each of the following by 100:

3.	500	700	1600	4500	2700	4800
4.	300	900	2300	5000	7000	9000

5. Divide each number in ex. 3 and 4 by 10.

6. If 10 desks cost \$90, find the cost of 1 desk.

7. Mr. Allen paid \$400 for 100 pairs of shoes. How much did each pair cost?

8. How many dimes can you get for 80 cents? for 60 cents? for 250 cents? for 200 cents?

9. How many dollars can you get for 500 cents?

MULTIPLYING AND DIVIDING BY 11

1. There are 11 players on a football team. How many players are there on 2 teams? on 3 teams? on 5 teams?

2. Count by 11's to 110, beginning 11, 22, 33, and so on. What do you notice that makes it easy to count by 11's?

3. Learn these tables:

$1 \times 11 = 11$	$7 \times 11 = 77$	$11 \div 11 = 1$	$77 \div 11 = 7$
$2 \times 11 = 22$	$8 \times 11 = 88$	$22 \div 11 = 2$	$88 \div 11 = 8$
$3 \times 11 = 33$	$9 \times 11 = 99$	$33 \div 11 = 3$	$99 \div 11 = 9$
$4 \times 11 = 44$	$10 \times 11 = 110$	$44 \div 11 = 4$	$110 \div 11 = 10$
$5 \times 11 = 55$	$11 \times 11 = 121$	$55 \div 11 = 5$	$121 \div 11 = 11$
$6 \times 11 = 66$	$12 \times 11 = 132$	$66 \div 11 = 6$	$132 \div 11 = 12$

4. Write the 11's table with 11 as the first figure in the table, like this: $11 \times 1 = 11$, $11 \times 2 = 22$, and so on.

Divide each of the following numbers mentally by 11. *Give only the quotient and the remainder:*

5. 61 31 0 34 80 25 53 89

6. 39 98 67 41 75 9 20 6

7. How many football teams can be made with the 40 boys in our class? Will there be any boys left over?

8. Louise is buying 12 yd. of gold ribbon at 11¢ a yard. How much must she pay for it?

MULTIPLYING AND DIVIDING BY 12

1. How many inches are there in 1 ft.? in 5 ft.?
2. How many eggs are there in 4 dozen eggs?
3. Count by 12's to 144, beginning 12, 24, 36.
4. Learn these tables:

$1 \times 12 = 12$	$7 \times 12 = 84$	$12 \div 12 = 1$	$84 \div 12 = 7$
$2 \times 12 = 24$	$8 \times 12 = 96$	$24 \div 12 = 2$	$96 \div 12 = 8$
$3 \times 12 = 36$	$9 \times 12 = 108$	$36 \div 12 = 3$	$108 \div 12 = 9$
$4 \times 12 = 48$	$10 \times 12 = 120$	$48 \div 12 = 4$	$120 \div 12 = 10$
$5 \times 12 = 60$	$11 \times 12 = 132$	$60 \div 12 = 5$	$132 \div 12 = 11$
$6 \times 12 = 72$	$12 \times 12 = 144$	$72 \div 12 = 6$	$144 \div 12 = 12$

5. Remember: $\mathbf{9 \times 12 = 12 \times 9}$
6. Write the table of 12's like this:

$12 \times 1 = 12$, $12 \times 2 = 24$, $12 \times 3 = 36$, etc.

7. Helen bought 6 dozen cookies for her party. How many cookies did she buy?
8. Oranges are selling at 30¢ a dozen or at 3¢ apiece. How much will you save on 12 oranges by buying a dozen at a time?
9. How many months are there in 7 years?

Divide each of the following numbers mentally by 12. *Give only the quotient and the remainder:*

10.	50	37	0	48	11	35	83	98
11.	46	22	1	109	84	75	49	59

12. Ed sold 132 eggs. How many dozen was that?

MULTIPLYING BY A TWO-FIGURE NUMBER

A fast train running between Chicago and Portland, Oregon, travels 42 miles an hour and makes the trip in 43 hours. How many miles does it travel?

You must multiply 42 by 43.

Multiply 42 by 3, which gives 126. Write 126 so that the 6 is under the 3 of 43.

Multiply 42 by 4, which gives 168. Write 168 so that the 8 is under the 4 by which you multiplied.

Add 126 and 168 as they stand. This gives 1806 as the product.

```
  42
  43
 126
168
1806
```

The train travels 1806 miles.

Check the work by going over it again.

126 and 168 are called **partial products.**

Exercises

1. Mr. Oliver travels 23 miles an hour in his automobile. How far can he travel in 12 hours?

2. Anna can make 43 artificial flowers in a day. How many can she make in 21 days?

3. It takes 48 stamps to fill each page of Jack's stamp book, and 42 pages are filled. How many stamps has he?

Multiply. Check the work by going over it again:

4. 34	6. 23	8. 42	10. 33	12. 43	14. 62
21	32	21	13	22	23
5. 59	7. 37	9. 68	11. 87	13. 59	15. 72
32	53	92	45	22	34

SCHOOL LUNCHROOM PROBLEMS

Check your work by going over it again.

1. The lunchroom buys 15 gallons of milk each day. A gallon of milk makes 16 glasses of milk. How many glasses are there in 15 gallons?

2. Each week 75 gallons of milk are used. How many gallons are used in the school year of 35 weeks?

3. About 65 apples are sold each day. In a month of 22 school days about how many apples are sold?

Practice until you can multiply and check 5 of the following examples in 5 minutes (after copying):

4. 83 52	11. 64 68	18. 84 43	25. 34 27	32. 34 82	39. 37 64
5. 84 49	12. 58 48	19. 23 97	26. 79 15	33. 63 17	40. 16 94
6. 49 65	13. 75 47	20. 63 43	27. 68 51	34. 42 28	41. 35 98
7. 38 63	14. 79 39	21. 36 85	28. 24 72	35. 24 53	42. 74 69
8. 73 28	15. 27 86	22. 89 41	29. 22 49	36. 19 63	43. 89 79
9. 56 39	16. 92 48	23. 49 25	30. 75 17	37. 71 52	44. 94 41
10. 68 57	17. 94 27	24. 85 51	31. 31 73	38. 58 26	45. 91 78

MULTIPLYING DOLLARS AND CENTS

1. Celia pays $1.25 for a music lesson. Last year she had 39 lessons. How much did the lessons cost?

You multiply dollars and cents just as you multiply other numbers.

First multiply 125 by 39, which gives 4875.

Place a decimal point before the last two figures of the answer.

The cost of the lessons was $48.75.

Check the work by going over it again.

$$\begin{array}{r} \$1.25 \\ 39 \\ \hline 11\,25 \\ 37\,5 \\ \hline \$48.75 \end{array}$$

2. Mr. Lawrence bought 35 tickets to the circus for the girls and boys in Roderick's class. He paid 55¢ for each ticket. How much did the tickets cost in all?

Write 55¢ as $.55. Then multiply it by 35.

Place the decimal point before the last two figures of the product.

Mr. Lawrence paid $19.25 for the tickets.

$$\begin{array}{r} \$.55 \\ 35 \\ \hline 2\,75 \\ 16\,5 \\ \hline \$19.25 \end{array}$$

Exercises

1. If each of a club's 35 members pays 75¢ in dues, how much money will the club have?

2. Alfred pays $2.25 an hour for his music lessons. How much does he pay for 26 hours?

WHEN WE NEED TO MULTIPLY

Check your work by going over it again.

1. How much will a shoemaker receive for repairing 13 pairs of shoes at $1.35 a pair?

2. At 35¢ each, find the cost of 48 baseballs.

3. May has a lunch allowance of 25¢ a day. In 23 school days, what is her total allowance?

4. The school library bought 93 new books at $1.16 each. How much did the books cost?

Practice until you can multiply and check 5 of the following examples in 8 minutes (after copying):

5. 24×$1.22	19. 36×$9.28	33. 16×$6.75
6. 14×$1.67	20. 47×$4.91	34. 91×$3.19
7. 27×$0.53	21. 28×$9.54	35. 62×$5.37
8. 63×$5.41	22. 56×$7.62	36. 57×$3.28
9. 71×$2.84	23. 34×$5.78	37. 37×$1.59
10. 68×$0.17	24. 65×$1.49	38. 48×$3.29
11. 12×$3.64	25. 96×$0.38	39. 69×$6.52
12. 82×$1.87	26. 27×$1.26	40. 28×$1.76
13. 54×$4.58	27. 27×$8.67	41. 15×$9.59
14. 34×$0.39	28. 98×$5.26	42. 76×$2.94
15. 25×$2.96	29. 39×$0.74	43. 17×$3.17
16. 95×$3.17	30. 49×$7.19	44. 39×$6.94
17. 68×$0.63	31. 53×$3.16	45. 32×$2.49
18. 19×$4.96	32. 54×$5.36	46. 83×$2.63

A TEST ON THE 90 DIVISION COMBINATIONS

Your work is *excellent* if you can do all the following orally in 2 minutes; it is *good* if you can do them in 3 minutes; and *fair* if you can do them in 4 minutes.

Give the quotients only:

1.	2)4	4)28	1)9	6)6	1)3	3)18
2.	1)6	3)27	7)28	5)15	8)48	5)0
3.	4)4	3)12	6)18	2)12	1)7	9)36
4.	4)0	3)6	4)16	5)30	7)14	6)48
5.	3)3	4)20	8)16	2)0	5)45	7)35
6.	9)9	6)24	6)42	5)20	1)1	3)0
7.	2)8	4)24	4)36	5)5	5)35	7)49
8.	3)9	6)30	2)16	9)0	5)25	1)8
9.	4)8	2)2	7)56	2)6	8)24	5)40
10.	7)0	9)27	3)24	6)12	9)18	8)64
11.	1)4	7)21	3)15	9)54	2)14	8)0
12.	8)8	5)10	8)40	9)72	9)63	2)18
13.	6)0	1)2	8)32	9)81	4)12	3)21
14.	7)7	8)56	2)10	8)72	6)54	7)63
15.	1)0	9)45	1)5	6)36	4)32	7)42

A HARDER TEST IN DIVISION

For ex. 1 to 6, 2 minutes is an *excellent* record, 3 minutes is *good*, and 4 minutes is *fair*.

Give the quotients and the remainders orally:

For example, in 5)32, say only "6 and 2 over."

1.	5)32	9)15	4)19	2)13	3)29	5)42
2.	6)15	3)20	7)25	9)19	7)18	3)11
3.	9)11	5)29	3)26	8)11	6)35	7)37
4.	8)19	3)14	8)27	4)35	5)24	2)17
5.	6)10	8)35	9)29	4)22	5)37	7)29
6.	6)27	4)29	7)27	4)14	8)46	6)19

For ex. 7 to 13, 3 minutes is *excellent*, 4 minutes is *good*, and 5 minutes is *fair*.

Give the results for the following orally:

7.	8)39	7)48	9)60	6)40	7)20	9)49
8.	8)21	9)32	7)31	6)51	8)77	7)58
9.	9)71	7)52	6)22	9)38	9)79	7)40
10.	6)53	8)55	7)45	9)23	8)70	9)65
11.	9)41	8)49	4)31	7)61	8)52	9)87
12.	8)61	9)83	6)44	7)68	8)31	9)59
13.	8)59	9)51	8)66	6)57	7)50	6)49

SOME FRACTIONS YOU NEED IN DIVISION

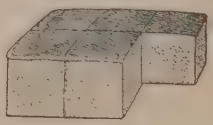
1. This apple is divided into 4 equal parts. What do you call 1 part? What do you call 2 parts? 3 parts? Write three fourths or three quarters like this: $\frac{3}{4}$.

2. Mary has a stick of candy which she divides into 3 equal parts. What do you call 1 part? 2 parts? Write two thirds like this: $\frac{2}{3}$.

3. Into how many equal parts is this pie divided? What do you call 1 part? 5 parts?

Write five sixths like this: $\frac{5}{6}$.

4. The picture below shows an apple $\frac{1}{4}$ of which has been cut off. What part of the apple is left? What part of a pie is shown in the picture? what part of a cake?



5. Jack has 2 apples and half of another apple. He says it is shorter to say that he has two and a half apples. He writes it like this: $2\frac{1}{2}$ apples.

6. May has 4 oranges and three quarters of another orange. She writes it like this: $4\frac{3}{4}$ oranges.

7. *Tell what these mean and draw a picture of each:*

$2\frac{1}{2}$ pies $6\frac{3}{4}$ apples $3\frac{3}{4}$ inches of ribbon

WRITING THE REMAINDER AS A FRACTION

1. Grandfather divided 15 apples equally between Bob and Jack. How many apples did each boy get?

When you divide 15 apples by 2, you get 7 apples, with 1 apple left over, which you have not yet divided. If you divide 1 apple between the 2 boys, each gets $\frac{1}{2}$ of it. Hence each boy got $7\frac{1}{2}$ apples.

$$2\overline{)15}\qquad 7\tfrac{1}{2}$$

In the answer $7\frac{1}{2}$, you see that the remainder 1 is written over the divisor.

When you have a remainder in a division problem, you can always write the remainder over the divisor, thus making a fraction in the quotient.

You now have two ways of writing the remainder:

Old Way	New Way
$2\overline{)15}$	$2\overline{)15}$
$7\ R\ 1$	$7\frac{1}{2}$

2. Divide 11 lb. of candy equally among 4 girls.

Dividing 11 by 4, you get 2 and a remainder of 3. Writing the 3 over the divisor 4, you have $\frac{3}{4}$. Hence the quotient is $2\frac{3}{4}$.

Each girl gets $2\frac{3}{4}$ lb. of candy.

$$4\overline{)11}\qquad 2\tfrac{3}{4}$$

Divide the following, writing the remainder over the divisor so as to make a fraction in the quotient:

3. $2\overline{)63}$ **5.** $4\overline{)49}$ **7.** $8\overline{)75}$ **9.** $3\overline{)428}$ **11.** $5\overline{)374}$

4. $3\overline{)47}$ **6.** $5\overline{)63}$ **8.** $2\overline{)115}$ **10.** $4\overline{)239}$ **12.** $8\overline{)137}$

PARTS OF A CENT

In the following problems, write each remainder over the divisor, making a fraction in the quotient.

1. When you buy 2 bananas for 5¢, how much does each banana cost?

2. Louise bought 3 pencils for 10¢. How much did each pencil cost?

3. Alice paid 25¢ for 2 yd. of ribbon. How much did she pay for each yard?

4. Will bought 3 marbles for 1¢. How much did each marble cost?

5. Jack paid 25¢ for 6 pads of paper. How much did each pad cost?

6. How much do you pay for 1 tennis ball if you get 3 balls for $1.00? 2 balls for 75¢? 2 balls for $1.25? 4 balls for $1.75?

Divide the following, writing the remainder over the divisor in the form of a fraction:

7. 2)775	12. 5)398	17. 6)893	22. 5)$2.34
8. 3)230	13. 7)593	18. 4)381	23. 4)$9.47
9. 6)355	14. 2)519	19. 3)895	24. 7)$4.14
10. 8)945	15. 9)652	20. 9)352	25. 8)$3.81
11. 4)751	16. 8)475	21. 7)745	26. 6)$7.81

HOW TO FIND AVERAGES

1. John sold magazines in his neighborhood. He sold 55 magazines the first week, 60 magazines the second week, and 65 magazines the third week. Hence he sold 180 magazines in 3 weeks.

To sell 180 magazines in 3 weeks is the same as to sell 60 magazines each week for 3 weeks. We may say that John sold an *average* of 60 magazines a week.

The third week John sold 5 more than 60 magazines, which made up for the first week when he sold 5 less than 60 magazines.

To find the *average* quickly, add the 3 numbers, 55, 60, and 65, which gives 180. Then divide 180 by 3. This gives 60 as the average number of magazines John sold in a week.

$$\begin{array}{r} 55 \\ 60 \\ 65 \\ \hline 3\overline{)180} \quad \text{Sum} \\ 60 \quad \text{Average} \end{array}$$

2. Last week Edgar worked 4 days. He worked 7 hr. on Monday, 6 hr. on Tuesday, 4 hr. on Thursday, and 6 hr. on Friday. Find the average number of hours a day he worked.

Add the 4 numbers and divide their sum by 4. The quotient, $5\frac{3}{4}$, means that Edgar worked *an average* of $5\frac{3}{4}$ hours a day. You divide by 4 because 4 numbers were added.

$$\begin{array}{r} 7 \\ 6 \\ 4 \\ 6 \\ \hline 4\overline{)23} \\ 5\frac{3}{4} \end{array}$$

3. Helen earned \$1.35 in 5 days. What was the average amount she earned in a day?

Here there are no numbers to add because you are told that the sum is \$1.35. Divide \$1.35 by 5 to find the average earnings.

FINDING AVERAGES

1. Mary had a popcorn stand at the county fair. On Monday she sold 72 bags of popcorn; on Tuesday, 48 bags; on Wednesday, 93 bags; on Thursday, 52 bags; and on Friday, 65 bags. How many bags did she sell, on an average, in a day?

2. Some boy scouts went on a 4-day hike. David kept a record of the number of miles they walked each day: Monday, 14 miles; Tuesday, 17 miles; Wednesday, 16 miles; and Thursday, 16 miles. What was the average distance they walked in a day?

3. Kate buys her lunch at school. Last week she spent 85¢ for lunches on the 5 school days. How much, on an average, did she spend per day?

4. Our class has 38 pupils. Last week 32 pupils were present on Monday, 37 on Tuesday, 38 on Wednesday, 33 on Thursday, and 35 on Friday. What was the average daily attendance last week?

5. Nat drove 895 miles in 4 days to visit a friend. Find the average distance he drove each day.

6. Four boys have just weighed themselves. Frank weighs 56 lb.; Jim, 64 lb.; Fred, 54 lb.; and Ned, 61 lb. Find their average weight.

7. Here are the heights of 8 children in Fred's class: Mary, 47 in.; Fred, 49 in.; Joe, 53 in.; Sue, 48 in.; Jack, 51 in.; Lulu, 49 in.; Ida, 52 in.; Tom, 54 in. Find their average height.

IMPROVING OUR SCHOOL RECORDS

1. In October Alice's mark in arithmetic was 86; in November, 82; in December, 90. What was her average mark for these 3 months?

2. Alice's arithmetic mark for January was 91; for February, 94; for March, 85. What was her average for these 3 months? Was it better than for the first 3 months?

3. Find Alice's average for the 6 months.

4. Jennie's marks in arithmetic were 89 for October, 83 for November, and 89 for December. What was her average for the 3 months?

5. Jennie's marks in arithmetic were 96 for January, 93 for February, and 96 for March. What was her average for these 3 months?

6. Find Jennie's average for the 6 months. Did Jennie or Alice do better for the 6 months?

7. Tom's report card for October gave him these marks: Arithmetic, 90; Geography, 84; History, 82; Language, 79; Reading, 88; Spelling, 94. What was his average mark in all his studies in October?

8. Will received these marks for October: Arithmetic, 70; Geography, 76; History, 71; Language, 70; Reading, 80; Spelling, 83. What was his average mark in all his studies for October?

9. If Will had received 94 in arithmetic, instead of 70, what would his average have been?

LEARNING LONG DIVISION

When you divide by a number of two or more figures, you must use **long division.** In long division all the steps are written down, while in short division much of the work is done mentally.

Divide 275 by 11, using long division.

Write the divisor at the left of 275 and draw a line over 275. In long division it is more convenient to write the quotient above the dividend.

```
          25   Quotient
Divisor 11)275  Dividend
           22
           55
           55
```

1. First divide 27 by 11, thinking "How many 11's are there in 27?" 27 is called the *partial dividend.* Since there are two 11's in 27, write 2 over 7, which is the last figure of 27.

2. Think "2 × 11 = 22." Write 22 under 27.

3. Subtract 22 from 27. The remainder is 5.

4. Compare the remainder, 5, with the divisor, 11. *The remainder must always be smaller than the divisor.*

5. Bring down the next figure of 275, which is 5. Write it after the remainder 5, making 55.

Repeat these five steps for the next quotient figure:

1. Think "55 ÷ 11 = 5." Write 5 in the quotient.
2. Think "5 × 11 = 55." Write 55 under 55.
3. Think "55 − 55 = 0."
4. Think "0 is less than 11, hence 5 is right."
5. There is no other figure to bring down from the dividend, hence the work is finished. The quotient is 25.

Check by multiplying 25 by 11, as shown above. Since the product, 275, is the same as the dividend, the work is right.

```
Check
  25
  11
 ---
  25
 25
---
275
```

THE FIVE STEPS IN LONG DIVISION

In long division the following five steps are necessary in finding each figure of the quotient:

1. *Divide* the partial dividend by the divisor. Write the first figure of the quotient over the last figure of the partial dividend.

2. *Multiply* the divisor by the quotient figure.

3. *Subtract.*

4. *Compare* the remainder and the divisor before you bring down the next figure. *The remainder should always be less than the divisor.*

5. *Bring down* the next figure of the dividend.

Remember the five steps thus: (1) Divide, (2) Multiply, (3) Subtract, (4) Compare, (5) Bring down.

Exercises in Long Division

Divide by 11, *using long division. Check:*

1. 253	**5.** 495	**9.** 3564	**13.** 6116	**17.** 2893
2. 374	**6.** 396	**10.** 1991	**14.** 2629	**18.** 5115
3. 473	**7.** 187	**11.** 4631	**15.** 4818	**19.** 9141
4. 242	**8.** 451	**12.** 7117	**16.** 3839	**20.** 4191

Divide by 12, *using long division. Check:*

21. 372	**25.** 768	**29.** 5316	**33.** 3972	**37.** 5196
22. 156	**26.** 684	**30.** 4488	**34.** 3192	**38.** 4764
23. 384	**27.** 528	**31.** 3864	**35.** 4968	**39.** 1476
24. 540	**28.** 996	**32.** 8724	**36.** 4296	**40.** 4428

ARRANGING CHAIRS IN ROWS

1. Jack is arranging seats for the school play. He puts 20 chairs in a row. How many rows do 85 chairs make? How many 20's are there in 85? Does Jack have any chairs left over?

To find how many rows of 20 chairs each Jack can make with 85 chairs, think "$8 \div 2 = 4$."

To find how many chairs are left over, think "$4 \times 20 = 80$; $85 - 80 = 5$."

There are 4 rows, and 5 chairs are left over.

$$\begin{array}{r} 4 \\ 20\overline{)85} \\ \underline{80} \\ 5 \end{array}$$

The number left over must be less than 20, because if 20 chairs or more were left over, they would make another row.

2. Suppose that Jack puts 21 chairs in each row. How many rows will 85 chairs make?

Since 21 almost equals 20, there are about as many 21's in 85 as there are 20's. Hence, to divide 85 by 21, think "$8 \div 2 = 4$." Then $85 \div 21$ is probably 4.

$$\begin{array}{r} 4 \\ 21\overline{)85} \\ \underline{84} \\ 1 \end{array}$$

4 is right because 1 is less than 21.

To find how many chairs are left over, think "$4 \times 21 = 84$; $85 - 84 = 1$." Since this remainder, 1, is less than 21, the quotient 4 is right.

There will be 4 rows of chairs, and 1 chair will be left over.

3. How many rows do 66 chairs make if 21 chairs are put in each row? How many chairs are left over?

DIVIDING BY 21

Mr. Lodge has \$6804, which he wishes to divide equally among 21 boys and girls to help them go to college. How much will each one receive?

Divide 6804 by 21 in this way:

1. The first partial dividend is 68. Divide 68 by 21, thinking "6 ÷ 2 = 3." Write 3 in the quotient over 8.
2. $3 \times 21 = 63$. Write 63 under 68.
3. Subtract 63 from 68. This leaves 5.
4. Compare the remainder, 5, with the divisor, 21. Is the remainder less than the divisor?
5. Bring down 0 and write it after 5, making 50.

Now repeat these five steps for the second quotient figure. First divide 50 by 21, thinking "5 ÷ 2 gives 2." Write 2 in the quotient. What are the other four steps? How do you find the third quotient figure?

```
  324
21)6804
  63
  ---
   50
   42
   --
    84
    84
    --
```

Check

```
  324
   21
  ---
  324
 648
 ----
 6804
```

Each boy and girl will get \$324. Check by multiplying.

When the divisor is 21, *divide by* 2 *to estimate the quotient figure.*

Exercises

Divide each number by 21 *and check the work:*

1. 693	**5.** 1071	**9.** 4473	**13.** 504	**17.** 9072
2. 483	**6.** 1491	**10.** 4893	**14.** 525	**18.** 7203
3. 462	**7.** 1092	**11.** 8988	**15.** 714	**19.** 5124
4. 882	**8.** 1281	**12.** 8904	**16.** 945	**20.** 5061

SHARING STAMPS

George has 1376 stamps. If he divides them equally among the 32 boys in his class, how many stamps will each boy receive?

You cannot divide 13 by 32, hence use 137 as the partial dividend.

1. To divide 137 by 32, think "How many 3's are there in 13?" Since there are 4 3's in 13, write 4 over 7, which is the last figure of 137.

2. Think "$4 \times 32 = 128$." Write 128 under 137.

3. Show how to complete the work and check it.

$$\begin{array}{r} 43 \\ 32\overline{)1376} \\ 128 \\ \hline 96 \\ 96 \\ \hline \end{array}$$

Exercises

1. Alice divided 483 stamps equally among 23 girls. How many stamps did each girl receive?

Divide, and check the work. When the divisor is 21, 22, *or* 23, *divide by* 2 *to estimate the quotient figure. When the divisor is* 31, 32, *or* 33, *divide by* 3 :

2. $682 \div 22$	**11.** $1302 \div 21$	**20.** $961 \div 31$
3. $462 \div 22$	**12.** $1743 \div 21$	**21.** $651 \div 31$
4. $484 \div 22$	**13.** $1155 \div 21$	**22.** $896 \div 32$
5. $726 \div 22$	**14.** $1974 \div 21$	**23.** $800 \div 32$
6. $924 \div 22$	**15.** $1512 \div 21$	**24.** $693 \div 33$
7. $506 \div 23$	**16.** $8673 \div 21$	**25.** $792 \div 33$
8. $782 \div 23$	**17.** $1166 \div 22$	**26.** $1457 \div 31$
9. $966 \div 23$	**18.** $1364 \div 22$	**27.** $7471 \div 31$
10. $672 \div 21$	**19.** $1584 \div 22$	**28.** $6972 \div 21$

DIVISORS ENDING IN 1, 2, 3, 4, OR 5

When a two-figure divisor ends in 1, 2, 3, 4, *or* 5, *divide by the first figure of the divisor to estimate each figure of the quotient.*

Thus, if the divisor is 41, 42, 43, 44, or 45, divide by 4 to estimate the quotient figure. If the divisor is 31, 32, 33, 34, or 35, divide by 3.

By what number should you divide if the divisor is 62? 73?

Divide the following and check the work:

1. $567 \div 21$	**18.** $1891 \div 31$	**35.** $5766 \div 93$
2. $651 \div 21$	**19.** $1763 \div 41$	**36.** $4277 \div 91$
3. $992 \div 31$	**20.** $1271 \div 41$	**37.** $5576 \div 41$
4. $806 \div 31$	**21.** $1071 \div 51$	**38.** $6273 \div 51$
5. $861 \div 41$	**22.** $1281 \div 61$	**39.** $8946 \div 71$
6. $984 \div 41$	**23.** $1491 \div 71$	**40.** $9492 \div 42$
7. $533 \div 41$	**24.** $1701 \div 81$	**41.** $5876 \div 52$
8. $816 \div 51$	**25.** $1696 \div 32$	**42.** $9512 \div 82$
9. $765 \div 51$	**26.** $2730 \div 42$	**43.** $9675 \div 43$
10. $732 \div 61$	**27.** $5589 \div 81$	**44.** $6466 \div 53$
11. $854 \div 61$	**28.** $2652 \div 52$	**45.** $1768 \div 34$
12. $923 \div 71$	**29.** $4526 \div 62$	**46.** $2376 \div 44$
13. $994 \div 71$	**30.** $3096 \div 72$	**47.** $2688 \div 64$
14. $972 \div 81$	**31.** $1452 \div 33$	**48.** $6696 \div 54$
15. $891 \div 81$	**32.** $2279 \div 43$	**49.** $1155 \div 35$
16. $819 \div 91$	**33.** $4032 \div 63$	**50.** $2790 \div 45$
17. $512 \div 32$	**34.** $5183 \div 73$	**51.** $5775 \div 25$

AUTOMOBILE PROBLEMS

1. Mr. Knowlton drives his car at an average of 21 miles an hour. How many hours will it take him to drive 273 miles? How many 21's are there in 273?

2. Jack's father averages 24 miles an hour in his car. How many hours will it take him to make a trip of 288 miles?

3. Mr. Brown drove his car 575 miles in 25 hours. How many miles per hour did he average?

4. Mr. Thomas used 23 gallons of gasoline on a trip of 506 miles. How many miles per gallon did he average?

5. Mr. Cook used 32 gallons of gasoline on a trip of 544 miles. How many miles per gallon did he average? Did he do as well as Mr. Thomas?

Divide the following and check the work:

6. $2747 \div 41$	**16.** $26{,}424 \div 72$	**26.** $37{,}064 \div 82$
7. $3392 \div 53$	**17.** $26{,}979 \div 51$	**27.** $19{,}932 \div 44$
8. $6768 \div 72$	**18.** $16{,}836 \div 92$	**28.** $39{,}744 \div 54$
9. $5063 \div 83$	**19.** $52{,}033 \div 61$	**29.** $31{,}450 \div 74$
10. $3384 \div 24$	**20.** $26{,}796 \div 84$	**30.** $89{,}582 \div 94$
11. $9664 \div 64$	**21.** $55{,}876 \div 61$	**31.** $17{,}990 \div 35$
12. $9990 \div 74$	**22.** $38{,}016 \div 72$	**32.** $62{,}560 \div 85$
13. $8155 \div 35$	**23.** $22{,}540 \div 92$	**33.** $18{,}260 \div 55$
14. $7810 \div 55$	**24.** $29{,}736 \div 63$	**34.** $18{,}975 \div 75$
15. $9225 \div 75$	**25.** $66{,}309 \div 93$	**35.** $44{,}030 \div 85$

DIVIDING DOLLARS AND CENTS

It cost Mr. Hill \$425.88 to run his automobile for a whole year. Find the average cost per week.

Since there are 52 weeks in a year, you divide \$425.88 by 52.

Divide dollars and cents in long division just as you divide any other numbers. Dividing 42588 by 52, you get 819. Place the decimal point in the quotient above the decimal point in the dividend. This gives \$8.19 as the quotient.

The average cost per week was \$8.19.

Check by multiplying \$8.19 by 52.

$$
\begin{array}{r}
\$8.19 \\
52\overline{)\$425.88} \\
416 \\
\hline
98 \\
52 \\
\hline
468 \\
468 \\
\hline
\end{array}
$$

Exercises

1. A boat club is spending \$204.75 for a second-hand motor boat. If 65 members share the expense equally, how much must each member pay?

2. A gas bill for July and August, 62 days, was \$13.02. How much, on the average, was the bill for a day?

Divide the following and check the work:

3.	\$426.87 ÷ 51	9.	\$140.28 ÷ 42	15.	\$13.25 ÷ 53
4.	\$128.73 ÷ 21	10.	\$197.16 ÷ 62	16.	\$29.70 ÷ 55
5.	\$156.64 ÷ 22	11.	\$354.41 ÷ 83	17.	\$53.25 ÷ 75
6.	\$119.83 ÷ 23	12.	\$301.49 ÷ 73	18.	\$88.35 ÷ 95
7.	\$667.74 ÷ 93	13.	\$466.70 ÷ 65	19.	\$31.24 ÷ 44
8.	\$109.72 ÷ 52	14.	\$468.65 ÷ 65	20.	\$55.44 ÷ 84

REMAINDERS IN LONG DIVISION

Wilfred buys a stamp book for his 1797 stamps. If he pastes 35 stamps on each page, how many pages of the book will he fill?

$$\begin{array}{r} 51 \\ 35\overline{)1797} \\ 175 \\ \hline 47 \\ 35 \\ \hline R\ 12 \end{array}$$

Dividing 1797 by 35, you get 51 as a quotient. There is a remainder of 12, which may be marked *R*. The quotient may also be written $51\frac{12}{35}$.

The stamps fill 51 pages, and 12 stamps are left over.

In checking, first multiply the quotient by the divisor, thus: $35 \times 51 = 1785$. Then add the remainder, 12, to 1785, which gives 1797. Since 1797 is the same as the dividend, the work is right.

Check

51	Quotient
35	Divisor
255	
153	
1785	
12	Remainder
1797	Dividend

Exercises

1. Doris is stringing beads. She has 900 beads, and she puts 62 beads on each string. How many strings can she make? How many beads will be left over?

Divide and check. Write R before each remainder:

2. $1911 \div 21$

3. $6836 \div 21$

4. $6293 \div 73$

5. $5719 \div 42$

6. $2410 \div 52$

7. $8879 \div 72$

8. $2052 \div 33$

9. $9961 \div 43$

10. $3330 \div 74$

11. $7949 \div 81$

12. $1798 \div 35$

13. $4768 \div 91$

14. $\$47.93 \div 84$

15. $\$59.60 \div 41$

16. $\$11.95 \div 22$

17. $\$69.57 \div 32$

18. $\$79.92 \div 72$

19. $\$19.35 \div 55$

WATCHING ZEROS IN LONG DIVISION

1. Mr. Lacy bought a bungalow for $5750. He agreed to pay for it in 23 months, paying the same amount each month. How much was he to pay each month?

Find the first two figures of the quotient in the usual manner.

When you subtract 115 from 115, you have no remainder. In other problems the work was finished when there was no remainder; but in this case there is a 0 in the dividend, which has not yet been brought down. Bring down the 0. Then divide 0 by 23, which equals 0, because 0 divided by any number equals 0. Write 0 in the quotient. Think "$0 \times 23 = 0$." Subtract 0 from 0, which leaves no remainder. Now the work is finished.

$$\begin{array}{r} 250 \\ 23\overline{)5750} \\ \underline{46} \\ 115 \\ \underline{115} \\ 0 \\ \underline{0} \end{array}$$

The quotient is 250.

Mr. Lacy was to pay $250 a month on his bungalow.

Check by finding 23×250.

2. Divide 19,215 by 63.

The first quotient figure is 3. Subtract 189 from 192, which leaves 3.

Bring down 1, making 31.

You see that 63 is contained no times in 31, because 31 is less than 63; hence you write 0 in the quotient.

Bring down 5 and write it after 31, making 315.

Think "$31 \div 6$ gives 5." Write 5 in the quotient. Since $5 \times 63 = 315$, the work is finished.

$$\begin{array}{r} 305 \\ 63\overline{)19215} \\ \underline{189} \\ 315 \\ \underline{315} \end{array}$$

The quotient is 305.

Check by finding 63×305. Does the result equal the dividend?

PROBLEMS IN LONG DIVISION

1. A tall building in a large city is 680 ft. high. This is how many times as high as a schoolhouse 34 ft. high?

2. It cost Mr. Lee $42,068 to run his factory for 52 wk. What was the average cost per week?

3. Albert traveled a distance of 1050 miles in a fast train in 21 hours. On an average, how many miles an hour did the train go?

4. A coal company collected $2626 in January selling coal at $13 a ton. How many tons were sold?

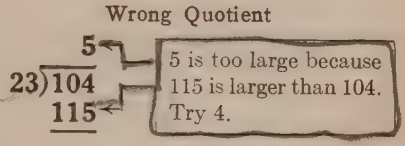
5. If 2415 tulip bulbs were planted in 23 equal rows, how many bulbs were put in each row?

Divide the following and check the work:

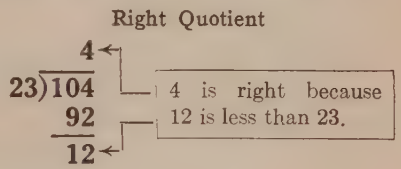
6.	21,252 ÷ 42	15.	18,396 ÷ 42	24.	$67.78 ÷ 22
7.	30,660 ÷ 73	16.	56,776 ÷ 94	25.	$78.00 ÷ 52
8.	55,266 ÷ 61	17.	51,538 ÷ 73	26.	$93.00 ÷ 62
9.	50,381 ÷ 83	18.	10,400 ÷ 65	27.	$88.58 ÷ 43
10.	36,654 ÷ 72	19.	18,798 ÷ 61	28.	$73.40 ÷ 43
11.	43,848 ÷ 72	20.	69,720 ÷ 83	29.	$73.13 ÷ 71
12.	38,038 ÷ 91	21.	15,574 ÷ 21	30.	$76.75 ÷ 25
13.	69,720 ÷ 83	22.	16,096 ÷ 32	31.	$86.80 ÷ 62
14.	38,656 ÷ 64	23.	66,430 ÷ 91	32.	$64.81 ÷ 31

AMY HAS TROUBLE IN FINDING THE QUOTIENT

1. Amy wants to divide 104 by 23. She thinks "10 ÷ 2 = 5. 5 × 23 = 115." Since 115 is larger than 104, she can not subtract 115 from 104; hence 5 is too large as quotient.



2. Amy then tries 4 as quotient. Multiplying 23 by 4, she gets 92. Subtracting 92 from 104, she gets 12 as a remainder. Since 12 is *less* than the divisor, 23, 4 is the right quotient.



When the quotient figure is too large, try the next smaller figure. When the quotient figure is right, the remainder is smaller than the divisor.

Exercises

Divide, using the rule on page 209. If the quotient figure is too large, try the next smaller number:

1. $23\overline{)164}$	**3.** $22\overline{)191}$	**5.** $84\overline{)320}$	**7.** $41\overline{)361}$
2. $32\overline{)281}$	**4.** $53\overline{)410}$	**6.** $75\overline{)215}$	**8.** $62\overline{)304}$

NOTE. In all the exercises on pages 207 to 214, the rule on page 209 immediately gives the correct quotient figure. On pages 215 to 217, it sometimes gives a quotient figure 1 too great.

HOW MUCH DID EACH PAIR OF BOOTS COST?

Mr. Allen has a shoe store. He paid $125.28 for 24 pairs of rubber boots. How much did each pair cost?

To get the first quotient figure, think "12 ÷ 2 = 6." You find that 6 is too large because 6 × 24 = 144 and 144 cannot be subtracted from 125. Hence try 5 as the quotient. 5 is right because it gives a remainder which is less than the divisor, 24.

Show how each of the other quotient figures is found.

```
      $5.22
24)$125.28
    120
     52
     48
      48
      48
```

Mr. Allen paid $5.22 for each pair of rubber boots.

Check by multiplying $5.22 by 24.

Exercises

1. Mr. Allen also bought 24 pairs of boys' rubber boots for $91.92. How much did each pair cost?

Divide the following and check the work:

2. 817 ÷ 43	**11.** 1216 ÷ 64	**20.** 9021 ÷ 31
3. 814 ÷ 22	**12.** 6552 ÷ 84	**21.** 8448 ÷ 44
4. 609 ÷ 21	**13.** 1045 ÷ 55	**22.** 9858 ÷ 53
5. 836 ÷ 44	**14.** 1218 ÷ 42	**23.** 8745 ÷ 55
6. 924 ÷ 33	**15.** 2035 ÷ 55	**24.** 9072 ÷ 24
7. 928 ÷ 32	**16.** 2436 ÷ 42	**25.** 6408 ÷ 24
8. 957 ÷ 33	**17.** 8170 ÷ 95	**26.** 7238 ÷ 94
9. 918 ÷ 34	**18.** 9834 ÷ 33	**27.** 9431 ÷ 25
10. 600 ÷ 25	**19.** 8084 ÷ 43	**28.** 8289 ÷ 24

PROBLEMS

1. Mr. Boden got 816 qt. of berries from his farm. If 24 qt. fill a crate, how many crates of berries did Mr. Boden have?

2. Last summer 22 children helped in Mrs. Ray's garden. They earned \$87.34. If they divided this equally, how much did each child get?

3. There are 45 children on a picnic. If 200 pieces of candy are divided equally among them, how many pieces will each child have? Will any candy be left?

4. Frank's teacher has 250 marbles. If he divides them equally among the 34 boys in the class, how many marbles will each boy get? How many will be left over?

Divide and check. Write R before each remainder:

5. $638 \div 22$
6. $824 \div 43$
7. $928 \div 33$
8. $829 \div 23$
9. $855 \div 45$
10. $6090 \div 21$
11. $5644 \div 83$
12. $7358 \div 93$
13. $2633 \div 53$
14. $3717 \div 63$
15. $5106 \div 74$
16. $9025 \div 33$
17. $8712 \div 24$
18. $2465 \div 85$
19. $3276 \div 84$
20. $8127 \div 43$
21. $6730 \div 23$
22. $8000 \div 23$
23. $4510 \div 92$
24. $4248 \div 64$
25. \$288.61 ÷ 73
26. \$152.64 ÷ 53
27. \$100.28 ÷ 23
28. \$403.38 ÷ 83
29. \$355.10 ÷ 53
30. \$184.14 ÷ 62
31. \$163.40 ÷ 43
32. \$246.67 ÷ 43
33. \$169.85 ÷ 43
34. \$163.20 ÷ 34

REVIEW OF ADDITION

Add the following and check the work:

1.	2.	3.	4.	5.	6.	7.
7	5	9	4	8	8	9
5	4	0	7	7	7	0
0	0	7	5	6	7	5
3	2	4	4	8	5	6
6	8	7	8	5	9	8
2	9	8	8	5	9	3

8.	9.	10.	11.	12.	13.	14.
4	7	2	3	5	6	4
2	3	4	4	5	2	6
6	8	8	2	6	2	3
0	6	3	6	2	7	4
2	9	7	0	0	3	5
8	0	4	9	4	4	6
5	3	7	9	8	9	9
9	7	1	5	6	1	7

Add without copying. Practice until you can do and check 5 of these examples correctly in 8 minutes:

15.	16.	17.	18.	19.
116	158	180	341	107
762	861	259	524	746
928	577	821	862	376
514	860	157	348	952
363	321	912	657	979
210	416	596	879	219

20.	21.	22.	23.	24.
869	938	914	864	396
475	673	160	528	609
952	305	353	333	795
340	228	441	187	164
764	374	101	800	535
509	714	996	475	251

REVIEW OF SUBTRACTION

Subtract without copying. Practice until you can do and check 10 *of these examples correctly in* 5 *minutes:*

1. 919 520	2. 750 152	3. 730 540	4. 800 388	5. 694 397
6. 462 174	7. 967 771	8. 957 699	9. 749 281	10. 664 591
11. 741 666	12. 840 576	13. 636 468	14. 682 463	15. 858 280
16. 444 356	17. 843 498	18. 811 753	19. 962 505	20. 721 378

Subtract without copying. Practice until you can do and check 10 *of these examples correctly in* 7 *minutes:*

21. 6010 1750	22. 5911 2149	23. 8828 2049	24. 9000 3241
25. 5129 2989	26. 4580 2940	27. 9362 6069	28. 7000 733
29. 7541 1762	30. 2804 953	31. 7264 1085	32. 9414 54
33. 8700 3182	34. 7433 1074	35. 6724 779	36. 6351 3920
37. 8625 2078	38. 6200 5143	39. 8765 987	40. 6720 845

MULTIPLYING BY A THREE-FIGURE NUMBER

Last year Mr. Hart worked 257 days, at \$7.50 a day. How much money did he earn last year?

Multiply \$7.50 by 257 like this:

Multiply 750 by 7, which gives 5250. Write 5250 under the line.

Multiply 750 by 5, which gives 3750. Write 3750 so that the 0 comes under the 5 by which you multiplied.

Multiply 750 by 2. Write the 1500 so that the right-hand 0 comes under the 2 by which you multiplied.

\$7.50	
2 57	
52 50	Partial products
375 0	
1500	
\$1927.50	

Add the partial products and place the decimal point before the last two figures of the answer.

You see that Mr. Hart earned \$1927.50 last year.

How do you check the work?

Exercises

Multiply. Check the work by going over it again:

1. \$6.12 234	5. 439 354	9. 658 475	13. 159 186	17. 478 723
2. \$1.43 112	6. 237 857	10. 348 926	14. 314 567	18. 975 642
3. \$7.62 361	7. 364 189	11. 295 379	15. 758 198	19. 658 385
4. \$3.69 417	8. 294 278	12. 629 569	16. 267 394	20. 815 756

A NEW WAY TO CHECK MULTIPLICATION

1. Here is a new check for multiplication:

Paul multiplies 326 by 213 and gets 69,438 as the product, as shown in *A*. To check the work, he multiplies 213 by 326, as shown in *B*. Since he gets the same answer as before, he considers his work right.

A *Problem*	*B* *Check*
326	213
213	326
978	1278
326	426
652	639
69438	69438

If the work is correct, both products are always alike, because $213 \times 326 = 326 \times 213$, just as $6 \times 9 = 9 \times 6$.

2. You can use this method to check other problems in multiplication, as shown at the right.

Problem	*Check*
122	98
98	122
976	196
1098	196
11956	98
	11956

3. Work examples 32 to 45 at the bottom of page 193 again and check each of them in this new way.

4. Work examples 5 to 20 on page 220 again and check each of them in the new way.

Multiply. Check the work in the new way:

5.	6.	7.	8.	9.
745	123	184	635	374
25	15	27	34	68

NOTE. Problems having one-figure multipliers, like 9×125, should be checked by going over the work again.

WATCHING ZEROS IN MULTIPLICATION

You must now learn how to multiply by a three-figure multiplier when it contains a zero.

1. Multiply 456 by 320.

To multiply 456 by 320, you can multiply it by 32 and annex a zero to the result. To do this, write 320 under 456, as shown here, letting the 0 stand out at the right. When you begin the work, first write the 0 of 320 below the line and then multiply by 2 and by 3. Note that the 8 of 1368 is written under the 3 of the multiplier.

```
  456
  320
 ----
 9120   <-- Write this 0 before multiplying by 2.
1368    <-- This 8 comes under the 3 of 320.
------
145920
```

2. Find the product of 456 and 302.

A	*B*
456	456
302	302
912	912
000	1368 ← This 8 must be written under the 3 of 302.
1368	137712
137712	

You could do the work as shown in *A*, but it is shorter to omit the row of zeros and to multiply as shown in *B*.

Exercises

Multiply. Check the work as shown on page 221:

1. 364 by 708	**5.** 574 by 860	**9.** 603 by 360
2. 597 by 510	**6.** 507 by 970	**10.** 475 by 403
3. 289 by 607	**7.** 928 by 308	**11.** 356 by 802
4. 256 by 409	**8.** 643 by 590	**12.** 924 by 920

PROBLEMS

1. The owner of a bird store bought 270 canaries at $3.98 apiece. How much did they cost in all?

2. Mr. Carter sold 265 umbrellas at $1.95 each. How much did he receive in all?

3. Daniel worked in a garden for 263 days at $3.75 a day. What were his wages for the year?

4. On a ranch there are 214 horses worth $115 each. How much are all the horses worth?

5. Last summer 232 members of our club took a boat ride. The fare was $3.46 for each person. How much was the fare for all of us?

6. The fare from Boston to New York by boat is $6.25. If the ticket agent sold 304 tickets for one trip, what was the total amount he received?

7. The fare from Seattle to China is $365. If a ship left Seattle with 207 passengers aboard, how much money did the ticket agent receive in fares?

8. An automobile agent sells 371 cars during the year. He receives $775 for each car. How much does he receive for all the cars?

9. The round trip from New York to Albany is 298 miles. A conductor on a train made 310 round trips last year. How many miles did he travel during the year?

10. If an airplane can travel 115 miles an hour, how far can it go in 13 hours?

ALWAYS MULTIPLY THE EASIER WAY

Mr. Clark sold 223 wool sweaters at \$5 each. How much did he receive for them?

You must multiply \$5 by 223. You could do this by writing 5 over 223, as shown in *A*; but it is awkward to multiply like this. It is much easier to multiply as shown in *B*, and you get the same answer because 5×223 gives the same product as 223×5.

When you do the work as shown in *B*, you must remember that the result, 1115, stands for dollars.

Mr. Clark received \$1115 for the sweaters.

A

$$\begin{array}{r} 5 \\ 223 \\ \hline 15 \\ 10 \\ 10 \\ \hline 1115 \end{array}$$

B

$$\begin{array}{r} 223 \\ 5 \\ \hline 1115 \end{array}$$

By reading the problem, you see that the answer must be dollars. Hence 1115 stands for \$1115.

Exercises

First decide whether the answer will be dollars or some other quantity. Then multiply the easier way.

1. Mr. Carter sold 112 tennis rackets for \$3 each. How much did he receive for all of them?

2. Jack's geography weighs 2 lb. How much would 126 geographies weigh?

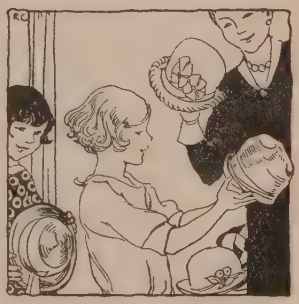
3. Mr. Smith sells sugar in 2-pound boxes. How many pounds of sugar are there in 72 boxes?

Multiply the following the easier way:

4. $654 \times \$2$
5. $762 \times \$8$
6. $819 \times \$5$
7. $153 \times 5¢$
8. $217 \times 3¢$
9. $318 \times 4¢$
10. 67×4 pears
11. 85×2 pens
12. 49×3 feet

PROBLEMS

Always write the numbers so that they may be multiplied the easier way.



1. Mary's aunt sells hats in a millinery store. Last week at a sale she sold 163 hats at \$4 each. How much did she get for all these hats?

2. Another week she sold 143 hats at \$2.75 each and 79 hats at \$2 each. How much did she get for them all together?

3. How much did she receive for 2 hats at \$7.35 each? for 6 hats at \$6.98 each?

4. One month Mary's aunt sold 148 hats at \$2 each, 107 hats at \$3 each, 96 hats at \$5 each, 59 hats at \$10 each, and 48 hats at \$15 each. What was the total amount of her sales that month?

5. There are 24 hours in a day and 365 days in a year. How many hours are there in a year?

6. Mr. Rice has 185 baskets, each containing 20 apples. How many apples has he in all?

7. A clothing store bought 305 winter coats at \$35 each. How much did the coats cost all together?

8. A school needs 114 new desks. How much will they cost at \$15 each?

DIVISORS ENDING IN 6, 7, 8, OR 9

1. How many 40's are there in 82? in 125?

2. How many 39's are there in 82? in 125?

3. You see that there are the same number of 39's in 125 as there are 40's, since 39 is almost equal to 40.

Since 39 almost equals 40, an easy way to find the number of 39's in 125 is *first to think of* 39 *as* 40, and then to think "12 ÷ 4 = 3." To make sure that 3 is the right quotient, multiply 39 by 3, which gives 117; then subtract 117 from 125, which leaves 8. Since 8 is less than 39, 3 is right.

```
  3
39)125
 117
   8
```

3 is right because 8 is less than 39.

4. Divide 262 by 48.

```
  5
48)262
 240
  22
```

First think of 48 as 50, and then think "26 ÷ 5 gives 5." Multiply 48 by 5 and subtract. How do you know that 5 is right?

5. The same method may be used to estimate the quotient whenever you divide by 56, 57, 58, or 59, or by 66, 67, 68, or 69, or by any other two-figure divisor ending in 6, 7, 8, or 9.

Thus, to divide 300 by 57, first think of 57 as 60 and then think "30 ÷ 6 = 5." To divide by 66, 67, 68, or 69, first think of each number as 70 and then divide by 7.

6. Of what number do you think when you estimate the quotient with the divisor 49? 69? 78?

When a two-figure divisor ends in 6, 7, 8, *or* 9, *divide by* 1 *more than the first figure of the divisor to estimate the quotient.*

SELLING APPLES AT SCHOOL

Our school lunchroom sold 824 apples in 39 days. This was an average of how many apples per day?

You must first divide 82 by 39. Since 39 is nearly 40, think "8 ÷ 4 = 2." Write 2 in the quotient. Then think "2 × 39 = 78." Subtract 78 from 82, which gives 4 as a remainder. Since 4 is less than 39, 2 is the right quotient.

To get the next quotient figure, divide 44 by 39, thinking "4 ÷ 4 = 1." Write 1 in the quotient. How do you know that 1 is right?

```
 21
39)824
   78
   44
   39
    5
```

The quotient is 21 and the remainder is 5. The lunchroom sold, on an average, a little over 21 apples a day.

Check by multiplying 21 by 39 and adding 5 to the result.

Exercises

1. During the fall the school lunchroom sold 821 apples in 29 days. How many apples, on an average, were sold each day?

2. During the spring 1180 apples were sold in 49 days. Find the average number sold per day.

Divide and check. Write R before each remainder:

3. 96 ÷ 29	9. 272 ÷ 88	15. 2411 ÷ 36
4. 183 ÷ 59	10. 567 ÷ 69	16. 3057 ÷ 58
5. 128 ÷ 36	11. 932 ÷ 29	17. 1654 ÷ 37
6. 354 ÷ 49	12. 800 ÷ 38	18. 2896 ÷ 67
7. 253 ÷ 47	13. 1669 ÷ 77	19. 9568 ÷ 79
8. 633 ÷ 88	14. 3788 ÷ 59	20. 4434 ÷ 19

USING DIVISION

1. Jack has 151 books. If he puts 28 books on each shelf of his bookcase, how many shelves will be filled? Will there be a shelf partly filled?

2. May has 82¢ to spend for her party. At 19¢ each, how many cakes can she buy?

(In estimating the quotient, think of 19 as 20.)

3. At 69¢ each, how many phonograph records can you buy for $2.14? How much will you have left?

First change $2.14 to 214¢. Then divide 214 by 69.

4. If an airplane averages 98 mi. an hour, about how many hours will it take it to travel 1481 mi.?

Since the divisor is 98, divide by 1 more than the first figure of 98 to estimate the quotient figure. The trial divisor is 10. To estimate the first quotient figure, think "14 ÷ 10 gives 1."

Divide and check. Write R before each remainder:

5. 2736 ÷ 28	**15.** 9792 ÷ 28	**25.** 16,504 ÷ 38
6. 2774 ÷ 88	**16.** 5896 ÷ 47	**26.** 21,688 ÷ 98
7. 1230 ÷ 39	**17.** 6094 ÷ 27	**27.** 24,349 ÷ 39
8. 1599 ÷ 48	**18.** 8163 ÷ 39	**28.** 14,011 ÷ 19
9. 1897 ÷ 59	**19.** 9747 ÷ 68	**29.** 37,890 ÷ 59
10. 2225 ÷ 67	**20.** 5273 ÷ 19	**30.** 24,085 ÷ 59
11. 4903 ÷ 79	**21.** 9606 ÷ 29	**31.** 21,010 ÷ 96
12. 3589 ÷ 49	**22.** 6018 ÷ 29	**32.** 35,154 ÷ 99
13. 4422 ÷ 56	**23.** 2770 ÷ 89	**33.** 48,543 ÷ 86
14. 4874 ÷ 77	**24.** 5798 ÷ 78	**34.** 48,206 ÷ 97

REMAINDERS LARGER THAN THE DIVISOR

Paul has \$2.38 and wants to know how many tennis balls he can buy at 39¢ each. \$2.38 is the same as 238¢. Hence Paul has to divide 238 by 39.

Paul first does the work as shown below in *A*. Since 39 is nearly 40, he thinks "23 ÷ 4 gives 5." But when he tries 5 as quotient, he gets a remainder of 43. This means that he will have 43¢ left over if he buys 5 balls. Since 43¢ is more than 39¢, he can buy another ball if he has 43¢ left. Hence 5 is too small as quotient.

A

```
      5 ←
39)238
   195
    43 ←
```

5 is too small because 43 is larger than 39.

B

```
      6 ←
39)238
   234
     4 ←
```

6 is right because 4 is less than 39.

Paul then tries 6 as quotient, as shown in *B*. This gives a remainder of 4. Since 4 is less than 39, 6 is right.

Paul can buy 6 balls and he will have 4¢ left.

When the remainder is equal to or larger than the divisor, make the quotient 1 *larger.*

Exercises

Divide, using the rule on page 226. *Check the work:*

1. 89 ÷ 29	**6.** 178 ÷ 29	**11.** 841 ÷ 87
2. 79 ÷ 37	**7.** 296 ÷ 49	**12.** 709 ÷ 78
3. 77 ÷ 39	**8.** 418 ÷ 59	**13.** 473 ÷ 66
4. 84 ÷ 26	**9.** 556 ÷ 69	**14.** 236 ÷ 58
5. 88 ÷ 27	**10.** 715 ÷ 79	**15.** 329 ÷ 46

THE SOCIAL CLUB HAS A PARTY

1. The Atwood Social Club is giving a party. The total cost will be \$36.40. The members of the club agree to pay $\frac{1}{4}$ of this amount. How much will the members pay all together?

2. If the club has 26 members, how much will each one have to pay?

3. The remaining \$27.30 is to be collected on tickets to the party. If the club plans to sell 78 tickets, how much should it charge for each ticket?

4. If the 26 members sell 78 tickets in all, what is the average number of tickets sold per member?

5 The members are making 475 paper flowers to decorate the tables. If 19 members share equally in this work, how many flowers must each make?

Divide. If there is a remainder, write R before it:

6. $1779 \div 57$	**16.** $3072 \div 48$	**26.** $59{,}620 \div 99$
7. $2795 \div 38$	**17.** $3659 \div 57$	**27.** $17{,}591 \div 49$
8. $2992 \div 49$	**18.** $2895 \div 76$	**28.** $47{,}817 \div 77$
9. $5592 \div 69$	**19.** $2412 \div 67$	**29.** $42{,}123 \div 57$
10. $4795 \div 77$	**20.** $5568 \div 96$	**30.** $53{,}756 \div 89$
11. $1751 \div 56$	**21.** $1320 \div 28$	**31.** $18{,}984 \div 28$
12. $1976 \div 37$	**22.** $2686 \div 79$	**32.** $20{,}630 \div 97$
13. $6973 \div 98$	**23.** $2499 \div 58$	**33.** $28{,}497 \div 69$
14. $1566 \div 36$	**24.** $7310 \div 86$	**34.** $26{,}233 \div 37$
15. $4193 \div 59$	**25.** $4256 \div 56$	**35.** $22{,}496 \div 37$

FINDING QUOTIENT FIGURES AT A GLANCE

When the dividend or the partial dividend is only slightly larger than the divisor, you see at a glance that the quotient is 1.

For example, you easily see in *A* that 39 contains 37 just once; hence 39 ÷ 37 gives 1.

Similarly, in dividing 583 by 56, as shown in *B*, you see that the partial dividend 58 contains 56 only once; hence the first figure of the quotient must be 1.

A

$$\begin{array}{r} 1 \\ 37\overline{)39} \\ 37 \\ \hline 2 \end{array}$$

B

$$\begin{array}{r} 1 \\ 56\overline{)583} \\ 56 \\ \hline \end{array}$$

When you get the quotient figure like this, you say that you find it by *inspection*. This method also tells you quickly when the quotient figure is 0.

In the example at the right, after subtracting 56 from 58 and bringing down 3, you see that 23 does not contain 56; hence you write 0 as the second figure of the quotient.

$$\begin{array}{r} 10 \\ 56\overline{)583} \\ 56 \\ \hline 23 \end{array}$$

Exercises

Find the quotients by inspection, when possible; otherwise use the rules on pages 209 *and* 226:

1. $27\overline{)28}$	**6.** $36\overline{)38}$	**11.** $39\overline{)23}$	**16.** $48\overline{)49}$
2. $39\overline{)96}$	**7.** $17\overline{)19}$	**12.** $97\overline{)98}$	**17.** $46\overline{)22}$
3. $26\overline{)26}$	**8.** $38\overline{)84}$	**13.** $27\overline{)99}$	**18.** $19\overline{)63}$
4. $56\overline{)54}$	**9.** $56\overline{)57}$	**14.** $87\overline{)43}$	**19.** $29\overline{)96}$
5. $28\overline{)73}$	**10.** $68\overline{)13}$	**15.** $88\overline{)88}$	**20.** $27\overline{)5}$

USING LONG DIVISION

1. An airplane traveled 2109 miles in 19 hours. How many miles per hour did it average?

2. Last week the school bookstore paid $29.16 for 27 dictionaries. What was the price of 1 dictionary?

Divide, using the method on page 231 *when possible:*

3. $408 \div 37$	9. $5843 \div 56$	15. $286 \div 26$
4. $290 \div 29$	10. $8902 \div 88$	16. $398 \div 36$
5. $4911 \div 46$	11. $2925 \div 28$	17. $290 \div 26$
6. $7903 \div 77$	12. $3962 \div 38$	18. $9925 \div 96$
7. $2780 \div 26$	13. $4803 \div 46$	19. $6950 \div 66$
8. $6905 \div 67$	14. $7841 \div 76$	20. $1011 \div 98$

Review Exercises

Divide, using the rules on pages 209 *and* 226:

1. $1575 \div 21$	8. $3356 \div 53$	15. $11{,}742 \div 53$
2. $1550 \div 55$	9. $2989 \div 49$	16. $39{,}429 \div 69$
3. $3244 \div 37$	10. $4218 \div 74$	17. $12{,}232 \div 44$
4. $7282 \div 22$	11. $1638 \div 42$	18. $58{,}183 \div 83$
5. $5544 \div 88$	12. $8590 \div 98$	19. $19{,}458 \div 47$
6. $4576 \div 44$	13. $3008 \div 64$	20. $36{,}480 \div 64$
7. $4871 \div 78$	14. $7371 \div 63$	21. $47{,}554 \div 59$

NOTE. For all 2-figure divisors above 18, the methods on pages 209, 226, and 231 give the correct quotient figure at the first estimate in about 75% of all cases. In practically all other cases the correct quotient figure is easily obtained by changing the estimated quotient by 1, as explained on pages 215 and 229.

DIVISORS FROM 13 TO 18

When the divisor is 13, 14, 15, 16, 17, or 18, the rules on pages 209 and 226 do not give the correct quotient figures. When you use these divisors, you must estimate the quotient figure as well as you can and then multiply *mentally* to see if the estimated quotient is right. To divide by 19, however, think of 19 as 20.

1. Divide 798 by 14.

```
   57
14)798
   70
   98
   98
```

If you try 6 as the first quotient figure and multiply 14 by 6 mentally, you get 84; hence 6 is too large. Then try 5.

2. An easy way to multiply 13, 14, 15, 16, 17, and 18 *mentally* by any number from 1 to 9 is to begin multiplying at the left instead of the right.

For example, to multiply 17 by 5 remember that the 1 in 17 means 10. Then, beginning at the left of 17, think as follows: "$5 \times 10 = 50$. $5 \times 7 = 35$. $50 + 35 = 85$."

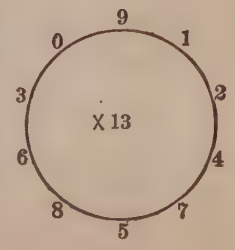
To multiply 18 by 7, think "$70 + 56 = 126$."

To multiply 13 by 9, think "$90 + 27 = 117$."

Exercises

1. Play this game. Multiply 13 mentally by each number on the circle.

2. Play the game again with 14 in the middle, instead of 13. Then place 15 in the middle; then 16; then 17; then 18.



TRAVELING TO FOREIGN COUNTRIES

1. It took Uncle Joe 18 days to go from New York to Brazil, a distance of 4374 miles. This is an average of how many miles a day?

How many miles a day, on the average, would you travel if you made each of the following trips from New York in the given time?

2. A trip of 4667 miles to Spain in 13 days.

3. A trip of 5810 miles to Turkey in 14 days.

4. A trip of 6016 miles to Egypt in 16 days.

5. A trip of 5355 miles to Iceland in 15 days.

6. A trip of 8721 miles to Japan in 17 days.

7. A trip of 6875 miles to Chile in 25 days.

8. A trip of 10,442 miles to China in 23 days.

Divide the following and check the work:

9. $544 \div 17$	**19.** $7928 \div 14$	**29.** $10{,}452 \div 13$
10. $765 \div 15$	**20.** $5376 \div 17$	**30.** $13{,}104 \div 14$
11. $592 \div 16$	**21.** $7668 \div 18$	**31.** $10{,}672 \div 16$
12. $306 \div 18$	**22.** $5552 \div 16$	**32.** $16{,}055 \div 17$
13. $960 \div 15$	**23.** $1081 \div 13$	**33.** $12{,}210 \div 18$
14. $767 \div 13$	**24.** $1261 \div 13$	**34.** $10{,}625 \div 17$
15. $812 \div 14$	**25.** $9135 \div 15$	**35.** $12{,}988 \div 17$
16. $986 \div 17$	**26.** $6849 \div 18$	**36.** $13{,}198 \div 18$
17. $845 \div 13$	**27.** $9542 \div 13$	**37.** $14{,}853 \div 18$
18. $109 \div 16$	**28.** $2941 \div 17$	**38.** $12{,}960 \div 18$

CAN YOU FIND THE MISTAKES?

Check the work in each of these problems by multiplying the quotient by the divisor and adding the remainder, if there is one. If you find that a problem is wrong, try to discover all the mistakes in it. Then do the problem correctly and check your work.

1.

```
  335
27)8235
  81
  135
  135
```

2.

```
  44
73)3139
  282
  319
  282
   37
```

3.

```
  31
32)9920
  96
  32
  32
```

4.

```
  67
29)1943
  174
  203
  203
```

5.

```
  716
27)2322
  189
   43
   27
  162
  162
```

6.

```
  318
29)9222
  87
  52
  29
  232
  232
```

7.

```
  335
47)15745
  141
  164
  141
   235
   215
    20
```

8.

```
  936
23)1898
  207
   82
   69
  138
  138
```

Check the problems below by multiplying to see if the answers are correct. If a problem is wrong, work it and find the right quotient. Then check it.

9. 16,252 ÷ 34 = 478
10. 20,154 ÷ 46 = 449
11. 17,019 ÷ 61 = 279
12. 21,844 ÷ 43 = 508
13. 63,804 ÷ 86 = 754
14. 41,534 ÷ 53 = 878
15. 37,235 ÷ 55 = 677
16. 13,795 ÷ 37 = 635

BUYING ON INSTALLMENTS

1. Mr. Edwards bought a secondhand car for $325. How many months did it take to pay for it at the rate of $25 a month?

2. Mrs. Jones bought some new furniture on the installment plan for $378. If she pays $27 a month, how many months will it take her to pay for it?

3. If you pay $.75 a week, how many weeks will it take to pay for a watch costing $10.50?

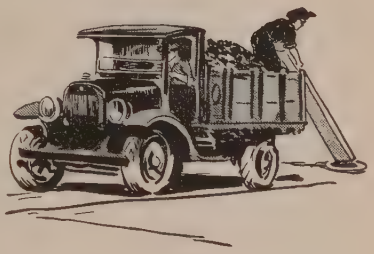
Change $.75 to 75¢ and $10.50 to 1050¢.

Review

Divide, and check the work:

1. 6657 ÷ 21	**14.** 3138 ÷ 57	**27.** 26,050 ÷ 38
2. 3025 ÷ 55	**15.** 1829 ÷ 31	**28.** 11,330 ÷ 22
3. 7056 ÷ 14	**16.** 8001 ÷ 63	**29.** 21,090 ÷ 74
4. 3082 ÷ 23	**17.** 3010 ÷ 94	**30.** 18,215 ÷ 28
5. 3603 ÷ 67	**18.** 8175 ÷ 75	**31.** 35,990 ÷ 59
6. 4864 ÷ 76	**19.** 9009 ÷ 33	**32.** 37,008 ÷ 72
7. 7015 ÷ 61	**20.** 8059 ÷ 25	**33.** 45,699 ÷ 65
8. 3712 ÷ 64	**21.** 8642 ÷ 17	**34.** 20,188 ÷ 52
9. 4914 ÷ 18	**22.** 3119 ÷ 49	**35.** 35,789 ÷ 89
10. 2466 ÷ 58	**23.** 6248 ÷ 88	**36.** 30,073 ÷ 59
11. 6605 ÷ 99	**24.** 7878 ÷ 26	**37.** 38,583 ÷ 87
12. 3809 ÷ 86	**25.** 2927 ÷ 78	**38.** 83,616 ÷ 96
13. 6279 ÷ 69	**26.** 9105 ÷ 15	**39.** 27,720 ÷ 63

TONS AND POUNDS



1. Jack bought 3 lb. of sugar and a 4-ounce can of baking powder and carried them home. He also ordered 2 tons of coal. Did he carry the coal home? Why not?

2. By what measures of weight are these things sold: butter, spice, coffee, meat, iron, large quantities of ice, small quantities of ice, pepper, hay?

3. Learn this table of *weight:*

16 ounces (oz.) = 1 pound (lb.)
2000 pounds (lb.) = 1 ton (T.)

4. A farmer received $13.75 a ton for his 9 T. of hay. How much did he receive in all?

5. Last year Mr. Forbes used 13 T. of coal to heat his house. How much did it cost at $14 a ton?

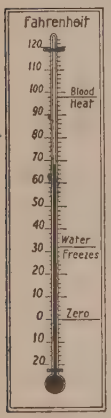
6. One of the elevators in a large building can carry only 1600 lb. How many men each weighing 200 lb. can ride on this elevator at the same time?

7. A 2-ton delivery truck can carry a load of 2 T., or 4000 lb. How many pounds can a 3-ton truck carry?

8. Every day last year Mrs. Fuller got 25 lb. of ice. In how many days did she use a ton of ice?

HOW TO READ THE THERMOMETER

When we want to know how hot or how cold it is, we look at a thermometer and read the number of *degrees* of temperature. The mercury in the tube rises as the temperature becomes warmer and falls as it becomes colder.



This thermometer shows a temperature of 68 degrees (written 68°). This is the most comfortable indoor temperature during the day for our schoolrooms or homes; but at night, if we are sleeping well covered, we are more comfortable in a much cooler room.

Notice that there are five small spaces between 60 and 70. Each small space stands for 2 degrees.

Show where the mercury would be if the temperature were 62°; 66°; 74°; 90°; 65°.

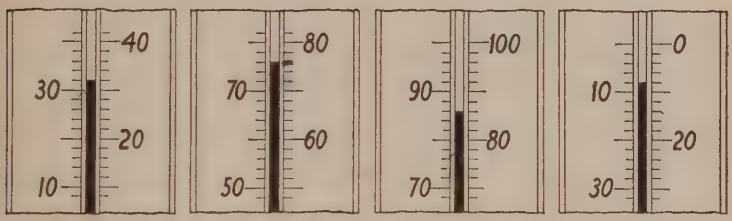
When it is cold enough for water to freeze, the temperature is 32°. This is called the *freezing point.* If it gets still colder, the mercury may drop to zero. When it is very cold, the mercury goes below zero.

When it is very hot, the temperature may rise to 90° or more. Water boils at 212°.

If you have a fever, your temperature may rise to 100° or even to 102° or 103°; but when you are well, your bodily temperature is about $98\frac{1}{2}$°. This is called *blood heat.*

MEASURING TEMPERATURE

1. Read the temperature on each thermometer. The last one shows a temperature below zero.



2. Jack was studying in his room when the temperature was 74°. How many degrees too warm was it?

3. How many degrees above zero is the freezing point?

4. Jim went skating when the temperature was 20°. How many degrees below the freezing point was it?

5. Last Christmas Day the temperature at our house was 68° indoors and 22° outdoors. How many degrees colder was it outdoors than indoors? Was it cold enough for the pond to freeze?

6. Newspapers often print weather reports giving the temperatures of the previous day. Find the highest and the lowest temperature yesterday in your city and the difference between them.

7. One Christmas Day the Weather Bureau reported a temperature of 66° in Southern California and one of 12° below zero in Duluth, Minnesota. What was the difference between these temperatures?

PROBLEMS

Before working these problems, tell whether you must add, subtract, multiply, or divide to get the answer.

1. Donald has saved \$8.73. If he sells his old bicycle for \$11.50, how much will he have then?

2. Mr. Carter traveled 1155 miles in his car in 7 days. How many miles did he average in a day?

3. Mary has saved \$5.88. She wants to buy a bicycle costing \$14.75. How much more money does she need?

4. Mrs. Lewis takes 14 children to Green Lake for a picnic. If the fare for each child is 35¢, how much fare does she pay for all the children?

5. Our class finds that it will cost \$8.64 to go on a picnic. If there are 32 children, what will be each child's share of the expense?

6. Catherine's mother buys a set of dining-room furniture for \$96. She pays \$8 a month. How many months will it take her to pay for the set?

7. There are 436 children in the Emerson School. Yesterday 78 children went to the museum and 81 children went to the park to study the trees. How many children were left at school?

8. Tom's daily marks in arithmetic last week were 90, 86, 70, 92, 87. What was his average mark for the week?

PROBLEMS

1. Fred planted 48 rows of lettuce in his garden, with 72 plants in each row. How many plants did he have?

2. Of Fred's lettuce plants, 2532 grew to be fine large heads of lettuce. How many dozen heads was that? How much did he get for them at 42¢ a dozen?

3. Fred spent \$27.50 of his money for radio parts, \$9.68 for a tennis racket, and \$12.65 for a scout uniform. How much did he have left?

4. Ruth has \$12.36. She spends \$7.98 for a new dress, \$3.49 for a hat, and \$.15 for car fare. How much money should she have left?

5. Find the total cost of 7 cans of peaches at 24¢ a can and 1 dozen eggs for 59¢.

6. The high-school boys gave a minstrel show. They sold 217 tickets at \$1.25 each and 114 tickets at \$.75 each. How much money did they collect?

7. Mrs. Dennis has 32 chocolate soldiers, 49 lollipops, 45 chocolate eggs, 31 fruit bars, and 23 peppermint sticks. If she puts the same number of pieces of candy into each of 12 boxes, how many pieces does she put into each box?

DRILL EXERCISES

Add the following and check the work:

1.	2.	3.	4.	5.	6.
97	94	77	71	67	15
40	68	84	25	93	66
64	47	98	38	32	40
88	56	70	50	85	57
11	90	36	42	10	57
46	39	66	36	89	82
89	75	89	79	93	24
36	56	27	54	39	39

Subtract the following and check the work:

7.	8.	9.	10.
\$517.00	\$901.00	\$750.90	\$631.01
238.14	376.48	643.09	401.07

Multiply the following and check the work:

11. 187 by 409 **13.** 483 by 270 **15.** 609 by 250
12. 481 by 630 **14.** 405 by 916 **16.** 357 by 823

Divide the following and check the work:

17. $149 \div 7$ **24.** $7168 \div 32$ **31.** $16{,}539 \div 37$
18. $385 \div 9$ **25.** $4482 \div 54$ **32.** $50{,}991 \div 69$
19. $413 \div 8$ **26.** $2277 \div 65$ **33.** $30{,}566 \div 58$
20. $618 \div 6$ **27.** $7698 \div 45$ **34.** $27{,}963 \div 29$
21. $750 \div 5$ **28.** $9300 \div 62$ **35.** $12{,}988 \div 17$
22. $910 \div 14$ **29.** $8569 \div 41$ **36.** $10{,}192 \div 16$
23. $5175 \div 23$ **30.** $4221 \div 63$ **37.** $65{,}980 \div 78$

CHAPTER V

LARGE NUMBERS

1. When you write numbers of 7 or more figures, you are writing *millions*. Large cities like New York, Paris, and London have populations of several *millions* of people.

2. A million is equal to 1000 thousand.

8 million is written thus: 8,000,000

294 million is written thus: 294,000,000

3. You have seen that it is easier to read a large number if you put commas between the groups of three figures, counting from the right. These groups are called **periods**. The first group at the right is the *units' period*, the second is the *thousands' period*, and the third is the *millions' period*.

Millions Thousands Units

$$\overbrace{102}^{\text{Millions}},\overbrace{408}^{\text{Thousands}},\overbrace{007}^{\text{Units}}$$

This number is read *102 million, 408 thousand, 7*.

The number 200,005,060 is read *200 million, 5 thousand, 60*.

4. Count by millions from 1,000,000 to 25,000,000.

5. Look in a newspaper and find all the numbers you can that contain millions.

USING MILLIONS

Read the following sentences:

1. One year money was deposited in the savings banks of the United States by 15,161,799 persons.

2. In a recent year the city of New York had a population of 6,139,520, while London had a population of 7,665,883.

3. One year our country had 105,710,620 inhabitants, including 11,573,230 children.

4. Kansas produced 128,100,000 bushels of wheat in one year, while Iowa produced 441,450,000 bushels of corn during the same year.

Read the following numbers:

5.	2,412,550	26,954,120	999,007,479
6.	9,700,080	50,594,006	256,056,807
7.	4,001,000	26,009,458	705,108,025

Write the following numbers in figures:

8. 18 million, 23 thousand, one hundred four.

9. 13 million, 150 thousand, seventy-nine.

10. Forty million, six thousand, seven.

11. One hundred fifty-six million, two hundred.

12. Seven million, five hundred thousand.

13. Beatrice was told that Mr. Coe is a *millionaire.* What does that mean?

14. What is the largest and the smallest number that you can write with 6 figures? with 7 figures?

ROMAN NUMERALS ABOVE 30

On page 121 you learned how to write Roman numerals to 30. All Roman numerals are written with seven letters, which have the following values:

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

The tens and hundreds are written as follows:

30 = XXX	70 = LXX	200 = CC	600 = DC
40 = XL	80 = LXXX	300 = CCC	700 = DCC
50 = L	90 = XC	400 = CD	800 = DCCC
60 = LX	100 = C	500 = D	900 = CM

The above table illustrates these rules for finding the value of two letters that are written side by side:

(1) If the letters are alike, add them. Thus, XXX = 30; CC = 200.

(2) If the first letter is of greater value than the second, add them. Thus, LX = 60; DC = 600.

(3) If the first letter is of less value than the second, subtract them. Thus, XL = 40; XC = 90.

400 is sometimes written CCCC, and 900, DCCCC.

Other numbers are written as follows:

91 = XCI	73 = LXXIII	1930 = MDCCCCXXX
49 = XLIX	355 = CCCLV	(1000 + 900 + 30)

USING ROMAN NUMERALS

Roman numerals are often used on clock faces, to number chapters of books, and to write dates on buildings. In some books the pages of the preface are numbered with small Roman numerals. In a theater program, the acts of the play are numbered with Roman numerals.

1. The cornerstone of a certain church reads: "Built MDCCCVIII." When was the church built?

2. At $2.50 per M, how much will 3000 envelopes cost? Remember that M = 1000.

3. Write the year of your birth in Roman numerals.

4. Tim has a set of encyclopedias. The last volume is XXXIV. How many volumes are there?

5. Mr. Brown had in his purse a bill that had XX printed on it. How many dollars was this bill?

6. On what coin do you sometimes find the letter V?

Read these numbers:

7.	XXXI	LVI	LXXV	MCDXCIX
8.	LXIII	CII	MMCX	MDCCCLV
9.	XCVII	CCX	MDCX	MDCCCCV
10.	XLIX	DCI	DCXL	MCCCCXCII

Write the following in Roman numerals:

11.	48	79	104	636	1220	1884
12.	64	99	487	843	1535	1915

REVIEW OF ADDITION

Copy and add the following. Check the work:

1.	2.	3.	4.	5.	6.
69	17	47	17	47	32
38	25	32	26	30	24
30	89	79	92	62	71
66	75	10	84	58	52
26	21	48	70	46	59
42	68	56	56	15	10
50	80	63	39	30	84
92	73	95	56	13	11
88	41	44	93	58	99
87	16	30	38	43	89

7.	8.	9.	10.
47,261	58,906	84,570	50,008
76,255	20,204	26,789	90,999

Add without copying. Practice until you can do and check the following 7 examples in 7 minutes:

11.	12.	13.	14.	15.	16.	17.
1	5	1	7	2	8	3
7	1	9	2	9	6	4
9	1	8	4	8	1	4
3	9	5	4	4	6	3
5	5	7	1	2	4	5
0	0	2	6	6	1	3
7	3	3	7	7	0	9
8	9	8	0	6	5	0
4	7	0	6	0	7	1
5	0	4	8	9	9	3
2	6	5	4	3	0	2
0	3	8	7	8	7	5
9	8	6	4	4	5	7

DRILL IN ADDITION

Add without copying. Practice examples 1 *to* 8 *until you can do and check* 4 *examples in* 8 *minutes:*

1.	2.	3.	4.
8623	5856	4036	3625
5365	1746	9179	9787
1192	4315	2026	4208
9770	1830	2660	9189
3804	6049	9531	3420
7249	7587	4839	3215
5346	9624	6353	4627

5.	6.	7.	8.
4261	2510	9651	7320
7937	7309	6347	7962
8860	8679	1044	8363
6507	4980	5540	5440
5681	4072	7701	4084
2014	6945	3927	1918
8879	1538	5856	8656

9.	10.	11.	12.
$429.07	$127.33	$216.35	$983.26
536.04	924.76	795.00	524.07

Copy, add, and check the work:

13.	14.	15.	16.
$627.08	$124.08	$ 73.62	$845.66
60.74	992.32	974.44	153.04
5.70	5.20	338.78	282.25
329.54	.19	660.60	6.90
56.39	65.53	9.72	5.98
8.09	98.87	930.09	69.17
961.73	248.44	168.47	732.61

REVIEW OF SUBTRACTION

1. Edward had a collection of 1017 stamps. He sold some of them and now has 878 stamps left. How many stamps did he sell?

2. One day 1278 people attended a matinée at a theater and 1829 people saw the evening performance. How many more people went in the evening than in the afternoon?

3. Mr. Harrison earns $3775 a year. If he pays $980 for rent and $1100 for food for his family, how much has he left for other expenses?

4. Jim's brother saved $600.00. He spent $480.47 for a trip to California. How much had he left?

Practice until you can subtract and check 8 *examples in* 6 *minutes:*

5. $4630.61 754.22	**10.** $7767.11 871.67	**15.** $1096.20 956.60	**20.** $9233.24 986.19
6. $8645.13 5960.77	**11.** $8500.67 775.59	**16.** $6430.92 473.23	**21.** $3911.43 960.89
7. $1075.46 838.56	**12.** $1841.76 753.19	**17.** $8792.29 4884.43	**22.** $7153.59 519.80
8. $8640.19 2848.82	**13.** $5510.36 821.34	**18.** $3753.18 847.61	**23.** $9149.01 973.14
9. $7008.63 2436.79	**14.** $6239.72 866.73	**19.** $4717.55 819.26	**24.** $2000.00 628.45

WATCHING ZEROS IN MULTIPLICATION

1. John wants to know how much money he can save in 280 days if he saves \$.17 a day.

To multiply \$.17 by 280, John writes 280 under \$.17, with the 0 of 280 standing out at the right. Below the line he writes a 0 under the 0 of 280; then he multiplies 17 by 8 and by 2.

\$.17
2 80
13 60 ← This 0 comes under the 0 of 280.
34 ← This 4 comes under the 2 of 280.
\$47.60

Notice that when John multiplies by 2, he writes 34 with its 4 directly under the 2.

Is John's multiplication correct? How much can he save?

2. Charles wants to know how much he will earn if he works 203 days at \$2.34 a day.

In multiplying \$2.34 by 203, Charles is careful to write the 8 of 468 under the 2 of 203. Can you tell why?

How much will Charles earn in 203 days?

\$2.34
2 03
7 02
468 ← This 8 comes under the 2 of 203.
\$475.02

Exercises

1. The Newton School needs 310 new desks. At \$5.85 each, how much will the desks cost?

Multiply. Check the work as shown on page 221:

2.	234	**4.**	467	**6.**	845	**8.**	925	**10.**	819
	509		801		370		108		690
3.	809	**5.**	382	**7.**	675	**9.**	706	**11.**	905
	712		604		890		305		350

REVIEW OF MULTIPLICATION

1. Our baseball team played the South Denver Lions on our athletic field. We sold 209 tickets at \$.75 each and 204 tickets at \$1.25 each. How much money did we collect for tickets?

2. When we played the Greeley team, we sold 360 tickets at \$1.15 each. How much did we collect at that game?

3. How much did we get in all if we sold 290 tickets at \$1.10 each and 305 tickets at \$.55 each?

Multiply the following and check the work:

4. 357 685	9. 802 637	14. 819 580	19. \$9.74 839	24. 768 7240
5. 129 295	10. 862 923	15. 706 650	20. \$8.25 375	25. 846 6350
6. 614 918	11. 974 502	16. 564 460	21. \$9.43 706	26. 923 6180
7. 537 279	12. 921 906	17. 307 790	22. \$3.78 194	27. 865 2980
8. 375 843	13. 569 347	18. 294 870	23. \$3.07 603	28. 194 3470

A TEST IN DIVISION

Give the quotients and the remainders orally. For the entire 8 lines, $2\frac{1}{2}$ min. is an excellent record, 4 min. is good, and 5 min. is fair:

For example, in 7)39 say only "5, and 4 over."

1.	7)39	2)15	5)29	8)38	3)10	4)23
2.	6)32	7)22	5)28	8)34	9)48	6)17
3.	3)19	6)28	3)11	9)39	5)33	3)16
4.	2)11	4)26	9)13	3)20	6)44	4)18
5.	3)22	8)29	3)28	7)13	8)49	6)15
6.	4)35	5)17	3)25	9)14	7)29	4)14
7.	3)26	5)27	9)29	8)18	7)45	2)19
8.	4)38	5)31	8)44	7)17	6)39	4)11

Give the results orally. For these 5 lines, 2 min. is excellent, 3 min. is good, and 4 min. is fair:

9.	9)40	6)53	7)48	6)29	9)70	5)38
10.	8)59	7)67	9)80	7)58	9)57	8)14
11.	6)35	3)29	9)59	8)46	7)54	9)17
12.	9)47	5)23	6)41	8)21	9)33	9)21
13.	7)41	5)14	6)46	7)26	9)85	8)71

A REVIEW OF LONG DIVISION

Arthur's chickens laid 879 eggs last year. This was an average of how many eggs per week? There are 52 weeks in 1 year.

You must divide 879 by 52.

Estimate each quotient figure by dividing by 5. (See the rule on page 209.)

For the first quotient figure, think "8 ÷ 5 gives 1. $1 \times 52 = 52$." Subtract 52 from 87. This gives a remainder of 35. Since 35 is less than 52, 1 is the right quotient figure.

Problem	*Check*
16	16
52)879	52
52	32
359	80
312	832
47	47
	879

Then think "35 ÷ 5 = 7." Trying 7 as quotient, you get $7 \times 52 = 364$, which cannot be subtracted from 359. Hence 7 is too large, and you must try 6. How do you know that 6 is right?

The quotient is 16 and the remainder, 47. You may also write the answer like this: $16\frac{47}{52}$. This means that the chickens laid an average of almost 17 eggs a week.

Check the work as shown above.

Remember that when the quotient figure is right, the remainder is less than the divisor.

Exercises

Divide, using the rule on page 209. *Check the work:*

1. 1562 ÷ 22	**6.** 2028 ÷ 75	**11.** 11,992 ÷ 23
2. 6645 ÷ 91	**7.** 6324 ÷ 93	**12.** 52,560 ÷ 72
3. 4030 ÷ 62	**8.** 3051 ÷ 44	**13.** 63,937 ÷ 84
4. 1070 ÷ 34	**9.** 5628 ÷ 84	**14.** 15,147 ÷ 51
5. 4399 ÷ 83	**10.** 2808 ÷ 72	**15.** 24,198 ÷ 32

DIVISORS ENDING IN 6, 7, 8, OR 9

Dick worked 39 hours last week and earned $17.94. How much an hour did he earn?

You must divide $17.94 by 39.

```
   $ .46
39)$17.94
   15 6
    2 34
    2 34
```

Since 39 ends in 9, estimate each quotient figure by dividing by 4, which is 1 more than the first figure of 39. (See the rule on page 226.)

To get the first quotient figure, think "17 ÷ 4 gives 4." Trying 4 as quotient, you get a remainder of 23, which is less than 39. Hence 4 is right.

Then think "23 ÷ 4 gives 5." Trying 5 as the second quotient figure, you get a remainder of 39. Since 39 *equals* the divisor, 39, you see that 5 is too small. Then try 6 as quotient figure. How can you tell that 6 is right?

You find that Dick earned $.46 an hour.

Make the quotient figure 1 *larger if the remainder is equal to or larger than the divisor.*

Exercises

Divide. Check the work by multiplying:

1. 6794 ÷ 89	**7.** 2856 ÷ 56	**13.** 20,395 ÷ 49
2. 5398 ÷ 87	**8.** 4899 ÷ 69	**14.** 33,263 ÷ 57
3. 5461 ÷ 56	**9.** 3593 ÷ 67	**15.** 50,838 ÷ 68
4. 2239 ÷ 48	**10.** 3984 ÷ 48	**16.** 35,792 ÷ 89
5. 4538 ÷ 79	**11.** 1599 ÷ 39	**17.** 47,348 ÷ 76
6. 6584 ÷ 88	**12.** 4754 ÷ 76	**18.** 15,290 ÷ 37

19. A merchant paid $13.72 for 49 caps. What was the price paid per cap?

PREPARING FOR EASTER

1. Alice fills 65 Easter rabbits with jelly beans. If she has 3200 jelly beans, how many can she put in each rabbit? How many will be left over?

2. How many chocolate Easter eggs costing 15¢ each can Nora buy for $2.00? (Write $2.00 as 200¢.)

3. Mr. Boyd receives $46.08 for 96 Easter lilies. How much does he get for each lily?

4. Mr. Ferris sells 72 doz. baby chicks for $126.00. How much does he charge for each dozen chicks?

Practice until you can divide and check 5 examples like ex. 5 to 17 in 7 minutes (after copying):

5. 6520 ÷ 98	18. 21,780 ÷ 35	31. 81,630 ÷ 39
6. 8160 ÷ 34	19. 10,625 ÷ 17	32. 20,958 ÷ 29
7. 3021 ÷ 53	20. 36,769 ÷ 99	33. 23,784 ÷ 87
8. 5917 ÷ 97	21. 22,464 ÷ 32	34. 37,076 ÷ 92
9. 4296 ÷ 76	22. 10,918 ÷ 53	35. 26,010 ÷ 51
10. 2430 ÷ 31	23. 30,996 ÷ 63	36. 12,672 ÷ 48
11. 4247 ÷ 63	24. 30,444 ÷ 86	37. 36,666 ÷ 56
12. 5670 ÷ 21	25. 25,959 ÷ 51	38. 13,867 ÷ 62
13. 3627 ÷ 93	26. 11,661 ÷ 23	39. 27,324 ÷ 66
14. 3936 ÷ 96	27. 35,577 ÷ 59	40. 32,275 ÷ 39
15. 4576 ÷ 44	28. 10,148 ÷ 43	41. 17,820 ÷ 22
16. 7105 ÷ 35	29. 24,519 ÷ 44	42. 41,877 ÷ 81
17. 1617 ÷ 21	30. 52,730 ÷ 19	43. 24,085 ÷ 59

FINDING AVERAGES

1. Ed took a 4-day trip in his automobile. He drove 180 miles the first day, 210 miles the second day, 225 miles the third day, and 170 miles the last day. How many miles a day did he average?

Add the four distances to find how far he drove in all. The sum is 785 miles. Then divide 785 by 4.

You find that Ed averaged $196\frac{1}{4}$ miles a day.

$$\begin{array}{r} 180 \\ 210 \\ 225 \\ 170 \\ \hline 4)\overline{785} \\ 196\frac{1}{4} \end{array}$$

2. Will took a 6-day trip. The distances he covered were 175 miles, 142 miles, 230 miles, 220 miles, 150 miles, and 250 miles. How many miles a day did he average?

3. Mr. Boyd is driving 3360 miles from Portland, Maine, to Seattle. He has 28 days in which to make the trip. How many miles a day must he average?

Do you have to add to find the total distance here?

4. Miss Bell added the weights of the 23 boys in Tim's class and got 1748 lb. Find the average weight per boy.

5. Jane's arithmetic marks for 5 months were as follows: 75, 85, 80, 95, 90. What was her average in arithmetic for those 5 months?

6. The 36 children in our class contributed $22.68 toward a Fresh Air Fund. What was the average contribution of each child in the class?

HOW MUCH DID EACH BOY EARN PER DAY?

1. Last summer Bob worked 60 days and received \$180. How much did he earn per day?

To divide 180 by 60, you can cut off a zero from each number and divide 18 by 6.

$$\begin{array}{r} 6\cancel{0}\overline{)18\cancel{0}} \\ \hline 3 \end{array}$$

You find that Bob earned \$3 a day.

2. Paul worked 300 days last year and earned \$1200. How much did he earn per day?

To divide 1200 by 300, cut off both zeros from each number and then divide 12 by 3.

$$\begin{array}{r} 3\cancel{0}\cancel{0}\overline{)12\cancel{0}\cancel{0}} \\ \hline 4 \end{array}$$

The quotient is 4. Hence Paul earned \$4 a day.

When the dividend and the divisor both end in 0, *cut off the* 0 *from each and then divide.*

When the dividend and the divisor both end in two 0's, *cut off both* 0's *from each and then divide.*

Exercises

Divide. Check the work by multiplying:

1. $60 \div 30$	**7.** $880 \div 220$	**13.** $9600 \div 800$
2. $40 \div 20$	**8.** $800 \div 400$	**14.** $9120 \div 380$
3. $90 \div 30$	**9.** $600 \div 300$	**15.** $7020 \div 270$
4. $120 \div 30$	**10.** $900 \div 300$	**16.** $2640 \div 120$
5. $180 \div 90$	**11.** $1600 \div 800$	**17.** $6800 \div 1700$
6. $720 \div 120$	**12.** $1400 \div 700$	**18.** $7200 \div 2400$

19. How many \$30 suits can be bought for \$1200?

20. A man buys a car for \$1600 and pays \$200 a month. How long will it take to pay for it?

THREE-FIGURE DIVISORS

The children in charge of our Field Day buy 724 paper hats for $101.36. Find the cost of 1 hat.

You must divide $101.36 by 724. Use the same five steps which you use with a two-figure divisor.

1. To get the first quotient figure, divide 1013 by 724. Think "10 ÷ 7 gives 1." Write 1 in the quotient over 3, the last figure of the partial dividend.
2. Multiply thus: 1 × 724 = 724.
3. Subtract 724 from 1013, leaving 289.
4. Notice that 289 is less than 724.

```
      $ .14
724)$101.36
     72 4
     28 96
     28 96
```

The remainder must always be less than the divisor.

5. Bring down 6 and write it after 289, making 2896.

The next partial dividend is 2896. To find the next quotient figure, think "28 ÷ 7 = 4," and proceed as before.

Put the decimal point in the quotient over the decimal point in the dividend.

The quotient is $.14. Hence each hat costs $.14.

Check by multiplying.

When the second figure of the divisor is 1, 2, 3, 4, *or* 5, *divide by the first figure of the divisor to estimate the quotient figure.* (See page 209.)

DRIVING A CAR ECONOMICALLY

1. Last year Mr. Burt drove his car 5152 miles. He used 224 gal. of gasoline during the year. How many miles did he average on 1 gal. of gasoline?

2. Mr. Orr drove his car 2667 miles on 127 gal. of gasoline. How many miles per gallon did he average?

3. Mr. Law drove 9592 miles and used 436 gal. of gasoline. How many miles did he average on 1 gal.?

4. Mr. Ross used 315 gal. of gasoline and drove 7560 miles in all. How far did he average on 1 gal.?

5. Which of the men in ex. 1 to 4 drove farthest, on an average, on 1 gal. of gasoline?

Divide the following and check the work:

6. $9009 \div 429$

7. $9763 \div 751$

8. $7872 \div 246$

9. $8450 \div 338$

10. $8432 \div 527$

11. $9888 \div 412$

12. $8918 \div 343$

13. $9112 \div 536$

14. $7812 \div 252$

15. $8627 \div 359$

16. $9697 \div 418$

17. $7276 \div 428$

18. $99{,}933 \div 852$

19. $75{,}969 \div 207$

20. $91{,}575 \div 429$

21. $15{,}645 \div 745$

22. $23{,}148 \div 643$

23. $67{,}769 \div 825$

24. $55{,}575 \div 741$

25. $26{,}008 \div 627$

26. $22{,}507 \div 317$

27. $449{,}506 \div 634$

28. $365{,}468 \div 847$

29. $224{,}991 \div 641$

THREE-FIGURE DIVISORS

Mr. Ford has a farm of 339 acres. Mr. Dick has a ranch containing 28,950 acres. Mr. Dick's ranch is how many times as large as Mr. Ford's farm?

In finding the first quotient figure, think "28 ÷ 3 gives 9." But $9 \times 339 = 3051$, which cannot be subtracted from 2895; hence 9 is too large. Try the next smaller figure, 8, as quotient. This gives a remainder of 183, which is smaller than 339; hence 8 is right.

For the second quotient figure, think "18 ÷ 3 = 6." Show why 6 is too large. Try 5 and show why it is right.

```
   85
339)28950
   2712
   1830
   1695
    135
```

The quotient is 85 with a remainder of 135. The answer may be written as $85\frac{135}{339}$.

You see that Mr. Dick's ranch is a little over 85 times as large as Mr. Ford's farm.

Exercises

1. Ben has 215 stamps. Ned has 2795 stamps. Ned's collection is how many times as large as Ben's?

Divide the following and check the work:

2. 8670 ÷ 255
3. 6132 ÷ 219
4. 9288 ÷ 344
5. 8303 ÷ 437
6. 8132 ÷ 428
7. 9968 ÷ 356
8. 8466 ÷ 249
9. \$721.27 ÷ 913
10. \$253.92 ÷ 552
11. \$408.88 ÷ 538
12. \$555.90 ÷ 654
13. \$607.38 ÷ 318
14. \$878.94 ÷ 257
15. \$801.83 ÷ 443

FINDING AVERAGES

The 287 children of the Clark School have a total of \$990.30 in the school savings bank. What is the average amount in the bank for each child?

You must divide \$990.30 by 287.

As the second figure of 287 is 8, divide by 3 to estimate each quotient figure. You do this because 287 is almost 300. To get the first quotient figure, think "9 ÷ 3 = 3." Multiplying 287 by 3, you get 861. Subtracting 861 from 990, you get 129, which is less than 287. Hence 3 is right.

For the second quotient figure, think "12 ÷ 3 = 4." 4 is right because the remainder 145 is less than 287.

For the third quotient figure, think "14 ÷ 3 gives 4." Multiplying 287 by 4, you get 1148. Subtracting 1148 from 1450, you get 302, which is larger than the divisor 287. Hence 4 is too small. Try 5. Why is 5 right?

```
   $3.45
287)$990.30
    861
   1293
   1148
    1450
    1435
      15
```

When the remainder is equal to or larger than the divisor, make the quotient figure 1 *larger.*

The answer may be written as $\$3.45\frac{15}{287}$.

The average amount per child is a little over \$3.45.

How do you check this answer? Check it.

In the work above, you estimated each quotient figure by dividing by 3, which is 1 more than the first figure of 287.

When the second figure of the divisor is 6, 7, 8, *or* 9, *divide by* 1 *more than the first figure of the divisor to estimate the quotient figure.* (See page 226.)

GOING AROUND THE WORLD

1. This boat makes a trip of 28,080 miles around the world in 195 days. How many miles a day does it go, on an average?

2. One year two men traveled 18,550 miles around the world in 687 hours. What was their average rate per hour? How many days and hours did the trip take?

Divide the following. Check your answer:

3. 8834 ÷ 398
4. 9118 ÷ 375
5. 9743 ÷ 687
6. 9245 ÷ 466
7. 7880 ÷ 394
8. 8928 ÷ 288
9. 7176 ÷ 276
10. 8597 ÷ 491
11. 9702 ÷ 462
12. 83,556 ÷ 396
13. 97,773 ÷ 897
14. 48,956 ÷ 379
15. 43,478 ÷ 194
16. 87,712 ÷ 896
17. 91,344 ÷ 692
18. 80,496 ÷ 387
19. 49,310 ÷ 283
20. 17,937 ÷ 577
21. 11,288 ÷ 332
22. 73,580 ÷ 283
23. 12,150 ÷ 485
24. 23,826 ÷ 418
25. 11,940 ÷ 384
26. 99,348 ÷ 487
27. 47,336 ÷ 776
28. 41,577 ÷ 585
29. 39,566 ÷ 542
30. 34,424 ÷ 662

FINDING PARTS OF A GROUP OF THINGS

1. May has divided these 12 roses into 4 equal bunches. What part of the 12 roses is 1 bunch? How many are $\frac{1}{4}$ of 12 roses?

2. How many are $\frac{3}{4}$ of 12 roses? To find $\frac{3}{4}$ of 12, think as follows:

$\frac{1}{4}$ of $12 = 3$

Hence $\frac{3}{4}$ of $12 = 3 \times 3$, or 9

3. Find $\frac{1}{4}$ of 8. Then find $\frac{3}{4}$ of 8.

4. When you have found $\frac{1}{4}$ of a number, how do you find $\frac{3}{4}$ of the number? Find $\frac{1}{4}$ of 16; $\frac{3}{4}$ of 16.

5. Tony has 15¢. He gives $\frac{2}{3}$ of his money to his sister. To find $\frac{2}{3}$ of 15¢, think as follows:

$\frac{1}{3}$ of $15¢ = 5¢$

Hence $\frac{2}{3}$ of $15¢ = 2 \times 5¢$, or 10¢

6. How do you find $\frac{2}{3}$ of a number? Find $\frac{1}{3}$ of 6¢; then find $\frac{2}{3}$ of 6¢.

State orally the answer to each of the following:

7. $\frac{1}{3}$ of 18	**10.** $\frac{1}{3}$ of 24	**13.** $\frac{1}{3}$ of 3	**16.** $\frac{1}{4}$ of 28
$\frac{2}{3}$ of 18	$\frac{2}{3}$ of 24	$\frac{2}{3}$ of 3	$\frac{3}{4}$ of 28
8. $\frac{1}{4}$ of 24	**11.** $\frac{1}{4}$ of 36	**14.** $\frac{1}{4}$ of 32	**17.** $\frac{1}{3}$ of 27
$\frac{3}{4}$ of 24	$\frac{3}{4}$ of 36	$\frac{3}{4}$ of 32	$\frac{2}{3}$ of 27
9. $\frac{1}{5}$ of 10	**12.** $\frac{1}{5}$ of 25	**15.** $\frac{1}{8}$ of 24	**18.** $\frac{1}{7}$ of 28
$\frac{2}{5}$ of 10	$\frac{2}{5}$ of 25	$\frac{3}{8}$ of 24	$\frac{2}{7}$ of 28
$\frac{3}{5}$ of 10	$\frac{4}{5}$ of 25	$\frac{5}{8}$ of 24	$\frac{5}{7}$ of 28

BUYING PARTS OF A YARD

1. How many inches are there in 1 yd.? How many inches of ribbon does Ann get if she buys $\frac{1}{4}$ yd.?

2. Lucy buys $\frac{3}{4}$ yd. of lace. How many inches of lace is that?

3. Mrs. Dorn needs $\frac{1}{2}$ yd. of velvet ribbon to trim a hat. How many inches of ribbon is that?

4. In a dry-goods store you will often find brass tacks along the edge of the counter, like this:

By these tacks the clerk measures $\frac{1}{4}$ yd., $\frac{1}{2}$ yd., etc. Draw a line 1 yd. long. Show where you would put tacks to measure $\frac{1}{4}$ yd.; $\frac{1}{2}$ yd.; $\frac{3}{4}$ yd.; 1 yd.

5. This picture shows how 1 in. is marked on your ruler. Into how many parts is the inch divided? What part of an inch is each small space?

6. Draw lines having these lengths: $\frac{5}{8}$ in.; $\frac{7}{8}$ in.; $\frac{3}{4}$ in.; $1\frac{1}{8}$ in.; $1\frac{3}{8}$ in.; $\frac{3}{4}$ ft.; $\frac{1}{4}$ yd.

Tell what numbers should be put in place of the dots:

7.	$\frac{2}{3}$ ft. = ·· in.	$\frac{3}{8}$ lb. = ·· oz.	$\frac{3}{4}$ ton = ·· lb.
8.	$\frac{5}{6}$ yd. = ·· in.	$\frac{3}{4}$ pk. = ·· qt.	$\frac{3}{4}$ hr. = ·· min.
9.	$\frac{2}{3}$ yd. = ·· ft.	$\frac{3}{4}$ gal. = ·· pt.	$\frac{2}{3}$ hr. = ·· min.
10.	$\frac{1}{2}$ ft. = ·· in.	$\frac{3}{4}$ lb. = ·· oz.	$\frac{5}{6}$ doz. = ·· things
11.	$\frac{1}{2}$ gal. = ·· qt.	$\frac{7}{8}$ lb. = ·· oz.	$\frac{3}{4}$ doz. = ·· things

MAKING SAILS AND PENNANTS

1. Arthur made a toy sailboat. For the sail he bought $\frac{3}{4}$ yd. of canvas at 36¢ a yard. How much did the canvas cost?

To find the cost of the canvas, take $\frac{3}{4}$ of 36¢.

2. A better grade of canvas costs 48¢ a yard. How much would $\frac{3}{4}$ yd. of this canvas cost?

3. Arthur made a smaller sailboat for his little brother. For the sail he used $\frac{5}{8}$ yd. of canvas at 40¢ a yard. How much did this sail cost?

4. At 40¢ a yard, find the cost of $\frac{1}{4}$ yd. of canvas; of $\frac{1}{2}$ yd.; $\frac{3}{8}$ yd.; $\frac{3}{4}$ yd.; $\frac{7}{8}$ yd.

5. Bill bought $\frac{3}{8}$ yd. of white wool felt at $3.20 a yard to make pennants for a launch. How much did the felt cost?

Find $\frac{1}{8}$ of $3.20 and then multiply the result by 3, as shown at the right.

$$\begin{array}{r} 8)\$3.20 \\ \$\ .40 \\ \times\ \ 3 \\ \hline \$1.20 \end{array}$$

6. He also bought $\frac{3}{8}$ yd. of red wool felt at $2.88 a yard. How much did he pay for it?

Find the cost of each of the following:

7. $\frac{3}{4}$ yd. of heavy duck at $1.28 a yard.

8. $\frac{5}{8}$ yd. of wool felt at $1.36 a yard.

9. $\frac{7}{8}$ yd. of light duck at $1.28 a yard.

10. *Find $\frac{3}{8}$ of each of the following numbers:*

72 64 88 208 712 904

11. Find $\frac{3}{4}$ of each of the numbers in ex. 10.

EARNING AND SAVING MONEY

1. Joe's position would pay him \$32 a month if he worked full time. He works only $\frac{3}{4}$ of the time each day. How much does he earn in a month?

2. John gets \$7.50 a week for working 6 days a week in a store. Last week he worked only 5 days. How much did he earn last week?

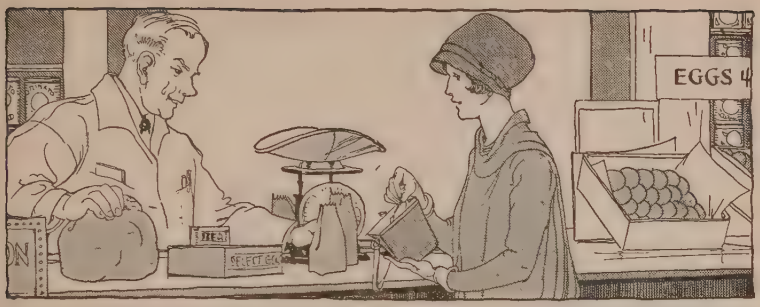
3. At the factory where she works, May can buy sweaters for $\frac{2}{3}$ of their regular price. How much must she pay for a sweater whose regular price is \$2.85? How much does she save on it?

4. Bill is saving to buy a pair of skates costing \$3.15. If he saves $\frac{2}{3}$ of this amount, his father will give him the rest. How much must Bill save?

5. At a sale Bob bought a pair of boots marked \$7.00 for $\frac{3}{4}$ of the marked price. How much did Bob pay for the boots? How much did he save on them?

Find the following. Check the work by going over it:

6. $\frac{2}{5}$ of 240	**14.** $\frac{7}{8}$ of \$1.12	**22.** $\frac{3}{4}$ of \$55.64
7. $\frac{3}{4}$ of 560	**15.** $\frac{3}{4}$ of \$2.96	**23.** $\frac{5}{8}$ of \$97.60
8. $\frac{2}{3}$ of 363	**16.** $\frac{2}{3}$ of \$5.97	**24.** $\frac{3}{4}$ of \$39.64
9. $\frac{3}{8}$ of 176	**17.** $\frac{2}{5}$ of \$8.40	**25.** $\frac{2}{3}$ of \$93.21
10. $\frac{7}{8}$ of 248	**18.** $\frac{4}{5}$ of \$1.25	**26.** $\frac{5}{6}$ of \$75.54
11. $\frac{3}{4}$ of 912	**19.** $\frac{3}{8}$ of \$6.16	**27.** $\frac{3}{5}$ of \$58.95
12. $\frac{3}{5}$ of 615	**20.** $\frac{2}{3}$ of \$3.33	**28.** $\frac{2}{5}$ of \$27.70
13. $\frac{2}{3}$ of 522	**21.** $\frac{5}{8}$ of \$9.04	**29.** $\frac{7}{8}$ of \$34.00



MARKETING

1. Mrs. Case is marketing. She buys $3\frac{1}{4}$ lb. of almonds at 48¢ a pound. How much do they cost?

You must multiply \$.48 by $3\frac{1}{4}$.

First think "$\frac{1}{4}$ of 48 = 12." Write 12 below the line so that the 2 comes under the 3. Next find 3 × 48, which is 144. Write 144 under 12 so that the right-hand 4 also comes under the multiplier 3, as shown here. Then add.

	\$ .48
	$3\frac{1}{4}$
	12
	1 44
	\$1.56

How much does Mrs. Case pay for the almonds?

2. She also buys $3\frac{3}{4}$ lb. of walnuts at 48¢ a pound. How much do the walnuts cost her?

Think "$\frac{3}{4}$ of 48 = 36." Write 36 under the line. Then proceed as in ex. 1.

	\$ .48
	$3\frac{3}{4}$
	36
	1 44
	\$1.80

Tell how much Mrs. Case must pay for each of these:

3. $2\frac{1}{2}$ doz. oranges at 50¢ a dozen.

4. $1\frac{1}{4}$ doz. brown eggs at 44¢ a dozen.

5. $2\frac{1}{8}$ lb. of cheese at 32¢ a pound.

6. $2\frac{3}{4}$ lb. of bacon at 40¢ a pound.

USING MIXED NUMBERS

1. Mr. Roberts worked $4\frac{1}{2}$ days last week. He earns \$6.50 a day. How much did he earn in all?

2. Alfred earns \$.48 an hour. How much did he earn last week if he worked $21\frac{3}{4}$ hr.?

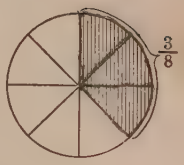
Find the cost of each of the following:

3. $6\frac{7}{8}$ yd. of satin at \$1.36 a yard.
4. $12\frac{1}{2}$ yd. of linen at 98¢ a yard.
5. $4\frac{1}{2}$ yd. of cretonne at 50¢ a yard.
6. $13\frac{1}{2}$ tons of coal at \$14.50 a ton.
7. $3\frac{3}{4}$ doz. roses at \$2.80 a dozen.
8. $10\frac{3}{4}$ doz. pencils at 16¢ a dozen.
9. $3\frac{3}{4}$ oz. of nutmeg at 8¢ an ounce.
10. $2\frac{5}{8}$ lb. of fruit cake at \$1.44 a pound.
11. $3\frac{3}{8}$ lb. of stuffed dates at 40¢ a pound.

Find the following. Check the work by going over it:

12. $2\frac{1}{2} \times 20¢$
13. $1\frac{1}{2} \times 18¢$
14. $3\frac{1}{4} \times 48¢$
15. $5\frac{3}{4} \times 44¢$
16. $8\frac{1}{3} \times 84¢$
17. $4\frac{3}{8} \times 72¢$
18. $2\frac{3}{8} \times 48¢$
19. $5\frac{1}{2} \times 54¢$
20. $4\frac{5}{8} \times 56¢$
21. $6\frac{2}{3} \times 45¢$
22. $9\frac{1}{2} \times 86¢$
23. $3\frac{2}{3} \times 27¢$
24. $4\frac{5}{8} \times 64¢$
25. $2\frac{7}{8} \times 40¢$
26. $4\frac{5}{6} \times 42¢$
27. $1\frac{1}{4} \times 64¢$
28. $2\frac{2}{3} \times 51¢$
29. $5\frac{3}{8} \times 32¢$
30. $3\frac{7}{8} \times \$1.36$
31. $4\frac{2}{3} \times \$2.97$
32. $8\frac{3}{4} \times \$1.04$
33. $7\frac{1}{8} \times \$2.96$
34. $9\frac{7}{8} \times \$1.60$
35. $4\frac{3}{4} \times \$1.76$
36. $9\frac{1}{2} \times \$5.20$
37. $4\frac{3}{4} \times \$2.48$
38. $5\frac{1}{8} \times \$3.36$

THE TERMS OF A FRACTION



1. This circle is divided into 8 equal parts. What do you call 1 part of the circle? What do you call 3 parts? 5 parts? 7 parts?

2. If you shade 3 of the 8 parts of the circle, you have shaded $\frac{3}{8}$ of it. In the fraction $\frac{3}{8}$, 3 is called the **numerator** and 8, the **denominator.**

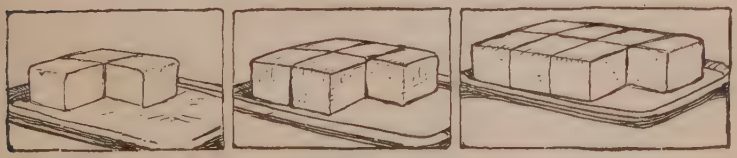
$$\frac{\textbf{3}}{\textbf{8}}\ \begin{matrix}\textbf{Numerator}\\ \textbf{Denominator}\end{matrix}$$

The denominator 8 shows that the whole circle has been divided into 8 equal parts. The numerator 3 shows that 3 of these parts have been taken. We call 3 and 8 the **terms** of the fraction $\frac{3}{8}$.

3. The fraction $\frac{1}{4}$ means that 1 whole thing has been divided into 4 equal parts and that 1 of these parts has been taken. What does $\frac{3}{4}$ mean?

4. Name the numerator and the denominator of each fraction and tell what the fraction means:

$\frac{1}{8}$ $\frac{7}{8}$ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{3}{5}$ $\frac{1}{7}$ $\frac{5}{8}$

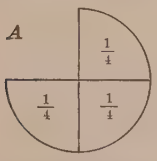


A *B* *C*

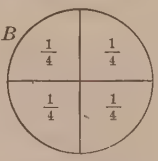
5. Study pictures *A*, *B*, and *C*. Then write the fraction that tells what part of each cake is left.

PROPER AND IMPROPER FRACTIONS

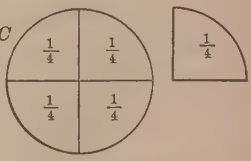
1. In Figure *A*, you see that $\frac{3}{4}$ of a circle is less than 1 whole circle. Hence $\frac{3}{4}$ is less than 1. Compare the numerator of $\frac{3}{4}$ with the denominator.



$\frac{3}{4}$ is less than 1.



$\frac{4}{4}$ equals 1.



$\frac{5}{4}$ is more than 1.

2. In Figure *B*, you see that it takes 4 fourths of a circle to make 1 whole circle. Hence $\frac{4}{4} = 1$. Compare the numerator and the denominator of $\frac{4}{4}$.

3. Figure *C* shows a whole circle and $\frac{1}{4}$ of another circle. How many fourths of a circle are there in all? Is $\frac{5}{4}$ more or less than 1? How does the numerator of $\frac{5}{4}$ compare with the denominator?

4. Compare $\frac{7}{8}$ of a circle with a whole circle; $\frac{9}{8}$ of a circle with a whole circle.

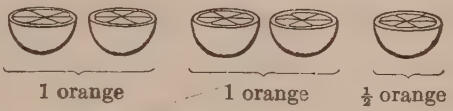
5. Fractions like $\frac{3}{4}$ and $\frac{7}{8}$, in which the numerator is *less than* the denominator, are called **proper fractions.** A proper fraction is always less than 1.

6. Fractions like $\frac{4}{4}$, $\frac{8}{8}$, $\frac{5}{4}$, and $\frac{9}{8}$, in which the numerator is *equal to* or *more than* the denominator, are called **improper fractions.** Improper fractions are either equal to or greater than 1.

7. Which fractions are less than 1? more than 1? equal to 1? $\frac{5}{8}$ $\frac{5}{4}$ $\frac{6}{6}$ $\frac{7}{2}$ $\frac{9}{4}$ $\frac{1}{5}$ $\frac{4}{4}$

REDUCING IMPROPER FRACTIONS

1. Mrs. Brown serves 5 half oranges for breakfast. How many whole oranges and half oranges is that?



You see that 5 half oranges are equal to $2\frac{1}{2}$ oranges. Hence $\frac{5}{2} = 2\frac{1}{2}$.

A short way to find that $\frac{5}{2} = 2\frac{1}{2}$ is to divide 5 by 2.

2. Draw a line 7 quarter inches long. How many whole inches and quarter inches are $\frac{7}{4}$ inches?

$$4\overline{)7}\quad 1\tfrac{3}{4}$$

You can also change $\frac{7}{4}$ in. to $1\frac{3}{4}$ in. by dividing 7 by 4, as above.

3. A number like 1, 7, or 13 is a **whole number.** A number like $2\frac{1}{2}$ or $1\frac{3}{4}$, made up of a whole number and a fraction, is called a **mixed number.**

To change an improper fraction to a whole number or to a mixed number, divide the numerator by the denominator.

Exercises

1. Mary has 7 boxes of candy, each weighing $\frac{1}{2}$ lb. How many pounds of candy are $\frac{7}{2}$ lb.?

2. Ida used $\frac{1}{4}$ yd. of ribbon for each of 9 badges. How many yards did she use in all? How many yards are $\frac{9}{4}$ yd.?

Change the following to whole or to mixed numbers:

3. $\frac{5}{4}$	**6.** $\frac{11}{8}$	**9.** $\frac{13}{8}$	**12.** $\frac{5}{3}$	**15.** $\frac{17}{8}$
4. $\frac{6}{2}$	**7.** $\frac{6}{5}$	**10.** $\frac{7}{3}$	**13.** $\frac{12}{4}$	**16.** $\frac{16}{8}$
5. $\frac{8}{4}$	**8.** $\frac{3}{2}$	**11.** $\frac{7}{6}$	**14.** $\frac{15}{8}$	**17.** $\frac{11}{4}$

ADDING FRACTIONS WITH THE SAME NAME

1. When you add things, they must always have the *same name*. You can add 3 tops and 4 tops and get 7 tops; but you cannot add 3 tops and 4 chairs, because they are not the same kind of things.

2. Which of these can you add? Tell why.

3 boys	2 cents	6 apples	6 wagons
2 hats	5 cents	4 apples	5 houses

3. Every fraction has a name, just like any other thing. Its denominator tells its name. In $\frac{3}{8}$, the denominator shows that the name of the fraction is *eighths*. The numerator, 3, tells *how many eighths* there are. You can add 3 *eighths* and 4 *eighths* because they both have the same name; the sum is 7 *eighths*. Hence you see that $\frac{3}{8} + \frac{4}{8} = \frac{7}{8}$. Do the work as shown at the right.

Think this:	*Write this:*
3 eighths	$\frac{3}{8}$
4 eighths	$\frac{4}{8}$
7 eighths	$\frac{7}{8}$

4. Can these be added? If they can, add them:

1 third	$\frac{1}{3}$	3 eighths	$\frac{3}{8}$	1 fourth	$\frac{1}{4}$
1 third	$\frac{1}{3}$	2 eighths	$\frac{2}{8}$	2 fourths	$\frac{2}{4}$

Tell the name of each fraction, and add:

5. $\frac{5}{8}$	**6.** $\frac{1}{8}$	**7.** $\frac{3}{6}$	**8.** $\frac{2}{4}$	**9.** $\frac{1}{3}$	**10.** $\frac{6}{8}$
$\frac{2}{8}$	$\frac{2}{8}$	$\frac{2}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{8}$

FRACTIONS WHOSE SUM IS 1 OR MORE

1. Mary had $\frac{5}{8}$ yd. of ribbon and Alice gave her $\frac{3}{8}$ yd. more. How much ribbon did Mary have then?

You see that $\frac{5}{8} + \frac{3}{8} = \frac{8}{8}$.
Hence Mary had in all $\frac{8}{8}$ yd. of ribbon, which is equal to 1 whole yard.

$$\frac{5}{8}$$
$$\frac{3}{8}$$
$$\frac{8}{8} = 1$$

2. Lewis ate $\frac{2}{4}$ of 1 apple and $\frac{3}{4}$ of another apple. How many apples did he eat in all?

You see that $\frac{2}{4} + \frac{3}{4} = \frac{5}{4}$. Changing $\frac{5}{4}$ to $1\frac{1}{4}$, you find that Lewis ate $1\frac{1}{4}$ apples in all.

$$\frac{2}{4}$$
$$\frac{3}{4}$$
$$\frac{5}{4} = 1\frac{1}{4}$$

Exercises

1. Mrs. Hoyt bought $\frac{1}{4}$ lb. of tea on Monday and $\frac{3}{4}$ lb. of tea on Tuesday. How much tea did she buy both days?

2. Ann's blouse is to have a hem $\frac{7}{8}$ in. wide, and $\frac{2}{8}$ in. extra is to be allowed for turning in the edge. How much must Ann allow for the hem?

3. Bob has $\frac{1}{8}$ lb. of copper wire. He buys $\frac{7}{8}$ lb. more. How much copper wire has he then?

Add these. Change improper fractions in the answers to whole numbers or to mixed numbers:

4. $\frac{9}{8}$	**6.** $\frac{3}{5}$	**8.** $\frac{2}{3}$	**10.** $\frac{7}{8}$	**12.** $\frac{2}{3}$	**14.** $\frac{2}{5}$	**16.** $\frac{7}{8}$
$\frac{7}{8}$	$\frac{2}{5}$	$\frac{2}{3}$	$\frac{4}{8}$	$\frac{1}{3}$	$\frac{4}{5}$	$\frac{2}{8}$
5. $\frac{5}{4}$	**7.** $\frac{4}{8}$	**9.** $\frac{1}{2}$	**11.** $\frac{5}{6}$	**13.** $\frac{7}{8}$	**15.** $\frac{3}{4}$	**17.** $\frac{3}{2}$
$\frac{2}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{6}$	$\frac{6}{8}$	$\frac{2}{4}$	$\frac{1}{2}$

ADDING MIXED NUMBERS

1. Doris walked $3\frac{1}{2}$ miles to visit a friend. Then she walked home again. How far did she walk in all?

To find out, write $3\frac{1}{2}$ under $3\frac{1}{2}$. Then think "$\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$, or 1." Carry this 1 to the whole numbers.

$$\begin{array}{r} 3\frac{1}{2} \\ 3\frac{1}{2} \\ \hline 7 \end{array}$$

Then think "1 (carried) + 3 + 3 = 7." Doris walked 7 miles.

2. George walked $1\frac{1}{2}$ miles on Monday, $2\frac{1}{2}$ miles on Tuesday, and $3\frac{1}{2}$ miles on Wednesday. How far did he walk in all?

To find out, write the numbers as shown here.
Think "$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2}$, or $1\frac{1}{2}$." Write $\frac{1}{2}$ and carry 1.
Then think "1 (carried) + 3 + 2 + 1 = 7."
You find that George walked $7\frac{1}{2}$ miles in all.

$$\begin{array}{r} 1\frac{1}{2} \\ 2\frac{1}{2} \\ 3\frac{1}{2} \\ \hline 7\frac{1}{2} \end{array}$$

Exercises

1. Allen buys $1\frac{1}{2}$ lb. of rice and $7\frac{1}{2}$ lb. of flour for his mother. How much do both packages weigh?

2. Mrs. Bond wants $2\frac{1}{4}$ yd. of cretonne for curtains, $2\frac{3}{4}$ yd. for a couch cover, and $1\frac{1}{4}$ yd. for a cushion. How many yards of cretonne should she buy?

Add. Check the work by going over it again:

3. $\begin{array}{r} 2\frac{1}{2} \\ 5\frac{1}{2} \\ \hline \end{array}$ **4.** $\begin{array}{r} 3\frac{3}{4} \\ 2\frac{1}{4} \\ \hline \end{array}$ **5.** $\begin{array}{r} 4\frac{5}{8} \\ 3\frac{3}{8} \\ \hline \end{array}$ **6.** $\begin{array}{r} 7\frac{2}{4} \\ 1\frac{3}{4} \\ \hline \end{array}$ **7.** $\begin{array}{r} 6\frac{2}{3} \\ 3\frac{2}{3} \\ \hline \end{array}$

KEEPING TRACK OF THE TIME

1. One evening Louise spent $1\frac{1}{4}$ hr. doing her homework and $\frac{3}{4}$ of an hour practicing her music. How much time did these lessons take her?

2. To-day Joe spent $\frac{1}{2}$ hr. on his arithmetic homework, $\frac{1}{2}$ hr. on his grammar, and $\frac{1}{2}$ hr. on his geography. How much time did he spend in all?

3. Arthur works for Mr. Adams. Last week he worked $1\frac{1}{4}$ hr., $2\frac{1}{4}$ hr., and $1\frac{3}{4}$ hr. How many hours did he work in all?

4. In making candy for a party, Ruth used $\frac{3}{4}$ lb. of sugar on Monday, $2\frac{1}{4}$ lb. on Tuesday, and $\frac{3}{4}$ lb. on Wednesday. How much sugar did she use in all?

Exercises

Add. Check the work by going over it again:

1. $2\frac{1}{3}$ $3\frac{1}{3}$	2. $2\frac{1}{4}$ $9\frac{3}{4}$	3. $2\frac{3}{4}$ 4	4. $4\frac{1}{3}$ $3\frac{2}{3}$	5. $3\frac{1}{8}$ $4\frac{2}{8}$
6. $9\frac{5}{6}$ $5\frac{1}{6}$	7. $7\frac{7}{8}$ $4\frac{4}{8}$	8. $9\frac{1}{6}$ $1\frac{4}{6}$	9. $4\frac{2}{3}$ $5\frac{2}{3}$	10. $8\frac{1}{8}$ $6\frac{7}{8}$
11. $2\frac{1}{2}$ $3\frac{1}{2}$ $1\frac{1}{2}$	12. $1\frac{1}{4}$ $4\frac{3}{4}$ $2\frac{1}{4}$	13. $4\frac{3}{8}$ $5\frac{1}{8}$ $2\frac{5}{8}$	14. $3\frac{3}{4}$ $2\frac{1}{4}$ $4\frac{3}{4}$	15. $4\frac{1}{2}$ 3 $2\frac{1}{2}$
16. $5\frac{1}{2}$ $7\frac{1}{2}$ $4\frac{1}{2}$	17. $4\frac{1}{4}$ $9\frac{3}{4}$ $6\frac{1}{4}$	18. $3\frac{5}{6}$ $3\frac{1}{6}$ $4\frac{5}{6}$	19. $8\frac{1}{3}$ $4\frac{2}{3}$ $6\frac{2}{3}$	20. $5\frac{1}{8}$ 9 $4\frac{7}{8}$

HALVES AND FOURTHS

1. How many quarters of a dollar make half a dollar? Is $\$\frac{2}{4}$ exactly equal to $\$\frac{1}{2}$?

2. One half of this circle is shaded. How many quarters of a circle are there in half of the circle? Since $\frac{2}{4}$ of a circle is the same as $\frac{1}{2}$ of the circle, $\frac{2}{4} = \frac{1}{2}$.

Since $\frac{1}{2}$ and $\frac{2}{4}$ both have the same value, you can always change $\frac{1}{2}$ to $\frac{2}{4}$ or you can change $\frac{2}{4}$ to $\frac{1}{2}$ when it will help you in working a problem.

3. Remember these: $\frac{1}{2} = \frac{2}{4}$ $\quad\quad$ $\frac{2}{4} = \frac{1}{2}$

4. Joan has $\frac{3}{4}$ lb. of candy in one box and $\frac{1}{2}$ lb. in another box. How much candy has she in all?

Joan cannot add 3 *fourths* and 1 *half* because they have different names. But if she changes $\frac{1}{2}$ to $\frac{2}{4}$, she can add 3 *fourths* and 2 *fourths*, because they then have the same name. Adding $\frac{3}{4}$ and $\frac{2}{4}$, Joan gets $\frac{5}{4}$, which equals $1\frac{1}{4}$.

$$\frac{3}{4} = \frac{3}{4}$$
$$\frac{1}{2} = \frac{2}{4}$$
$$\frac{5}{4} = 1\frac{1}{4}$$

Joan has $1\frac{1}{4}$ lb. of candy in all.

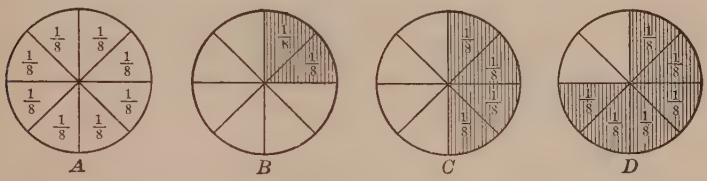
5. Ben studied $\frac{1}{4}$ hr. this afternoon and $\frac{1}{2}$ hr. this evening. How long did he study to-day?

Add these. Arrange the work as in ex. 4 above:

6. $\frac{1}{2}$ $\frac{3}{4}$	7. $\frac{2}{4}$ $\frac{1}{2}$	8. $\frac{1}{2}$ $\frac{5}{4}$	9. $2\frac{1}{2}$ $3\frac{1}{4}$	10. $6\frac{1}{2}$ $5\frac{3}{4}$
11. $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{4}$	12. $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{4}$	13. $\frac{1}{4}$ $\frac{3}{4}$ $\frac{1}{2}$	14. $2\frac{1}{2}$ $2\frac{1}{2}$ $3\frac{3}{4}$	15. $6\frac{3}{4}$ $2\frac{1}{4}$ $1\frac{1}{2}$

COMPARING HALVES, FOURTHS, AND EIGHTHS

1. Circle A is divided into 8 equal parts. Since 8 eighths of a circle make a whole circle, $\frac{8}{8} = 1$.



2. Shade $\frac{1}{4}$ of a circle, as in B. How many eighths of a circle make $\frac{1}{4}$ of a circle? This shows that $\frac{1}{4} = \frac{2}{8}$.

3. Shade $\frac{1}{2}$ of a circle, as in C. How many eighths of a circle make $\frac{1}{2}$ of a circle? This shows that $\frac{1}{2} = \frac{4}{8}$.

4. Shade $\frac{3}{4}$ of a circle, as in D. How many eighths of a circle make $\frac{3}{4}$ of a circle? This shows that $\frac{3}{4} = \frac{6}{8}$.

5. Since $\frac{3}{4} = \frac{6}{8}$, you can change $\frac{3}{4}$ to $\frac{6}{8}$ or change $\frac{6}{8}$ to $\frac{3}{4}$. You can also change $\frac{1}{2}$ to $\frac{4}{8}$ and $\frac{1}{4}$ to $\frac{2}{8}$.

6. Remember the following:

$$\frac{1}{4} = \frac{2}{8} \qquad \frac{1}{2} = \frac{4}{8} \qquad \frac{3}{4} = \frac{6}{8}$$
$$\frac{2}{8} = \frac{1}{4} \qquad \frac{4}{8} = \frac{1}{2} \qquad \frac{6}{8} = \frac{3}{4}$$

Exercises

1. On your ruler show how long $\frac{3}{4}$ of an inch is. Show how long $\frac{6}{8}$ of an inch is. Does $\frac{3}{4}$ in. $= \frac{6}{8}$ in.?

2. On your ruler show that $\frac{1}{4}$ in. equals $\frac{2}{8}$ in. Also show that $\frac{1}{2}$ in. equals $\frac{2}{4}$ in. or $\frac{4}{8}$ in.

3. May said that she had $\frac{6}{8}$ of a yard of ribbon. Say this in another way.

A SHORT WAY TO CHANGE $\frac{3}{4}$ TO $\frac{6}{8}$

1. By dividing a circle into parts, you have just learned that $\frac{3}{4}$ and $\frac{6}{8}$ have the same value. Hence, in working problems, $\frac{3}{4}$ may be changed to $\frac{6}{8}$.

2. A quick way to change $\frac{3}{4}$ to $\frac{6}{8}$ is to multiply both terms of $\frac{3}{4}$ by 2, in this way:

$$\frac{3 \times 2 = 6}{4 \times 2 = 8}$$

3. Similarly, a quick way to change $\frac{1}{2}$ to $\frac{4}{8}$ is to multiply both terms of $\frac{1}{2}$ by 4, as shown below:

$$\frac{1 \times 4 = 4}{2 \times 4 = 8}$$

4. By what number do you multiply both terms of $\frac{1}{4}$ to change $\frac{1}{4}$ to $\frac{2}{8}$? Have $\frac{1}{4}$ and $\frac{2}{8}$ the same value?

If you multiply both terms of a fraction by the same number, you get another fraction with the same value.

Exercises

In each problem, tell what number should be put in place of the star so that both fractions will have the same value:

1. $\frac{1}{2} = \frac{*}{4}$ $\quad \frac{2}{4} = \frac{*}{8}$ $\quad \frac{1}{2} = \frac{*}{8}$ $\quad \frac{1}{4} = \frac{*}{8}$ $\quad \frac{3}{5} = \frac{*}{10}$

2. $\frac{1}{3} = \frac{*}{6}$ $\quad \frac{2}{3} = \frac{*}{6}$ $\quad \frac{1}{2} = \frac{*}{6}$ $\quad \frac{3}{4} = \frac{*}{12}$ $\quad \frac{2}{3} = \frac{*}{12}$

3. By what number should you multiply both terms of $\frac{1}{2}$ to change $\frac{1}{2}$ to $\frac{5}{10}$?

REDUCING A FRACTION TO LOWEST TERMS

1. You have learned that you can change $\frac{3}{4}$ to $\frac{6}{8}$ by multiplying both terms of $\frac{3}{4}$ by 2. If you wish to change $\frac{6}{8}$ back to $\frac{3}{4}$, you can do so by dividing both terms of $\frac{6}{8}$ by 2, as shown below:

$$\frac{6 \div 2 = 3}{8 \div 2 = 4}$$

2. Likewise you can change $\frac{4}{8}$ to $\frac{1}{2}$ by dividing both terms of $\frac{4}{8}$ by 4, as shown here:

$$\frac{4 \div 4 = 1}{8 \div 4 = 2}$$

If you divide both terms of a fraction by the same number, you get another fraction with the same value.

3. What fraction do you get when you divide both terms of $\frac{4}{8}$ by 2?

When you change $\frac{4}{8}$ to $\frac{2}{4}$, you reduce $\frac{4}{8}$ to *lower terms;* but when you change $\frac{4}{8}$ to $\frac{1}{2}$, you reduce $\frac{4}{8}$ to its *lowest terms* because $\frac{1}{2}$ cannot be reduced further.

To reduce a fraction to lowest terms, divide the terms by the largest number that will divide both terms exactly.

Exercises

1. Reduce each fraction to lowest terms:

$\frac{2}{8}$ $\frac{2}{10}$ $\frac{2}{4}$ $\frac{2}{6}$ $\frac{3}{6}$ $\frac{4}{6}$ $\frac{2}{12}$ $\frac{4}{12}$ $\frac{3}{9}$

2. Sarah says, "I have $\frac{6}{8}$ of a yard of crêpe paper." In what other way could Sarah say this?

ADDING EIGHTHS

Nora buys $\frac{1}{8}$ lb. of cinnamon and $\frac{1}{8}$ lb. of cloves. How much do both weigh?

The sum of $\frac{1}{8}$ and $\frac{1}{8}$ is $\frac{2}{8}$, which can be reduced to $\frac{1}{4}$. Both together weigh $\frac{1}{4}$ lb.

Check the work by going over it again.

$$\begin{array}{r} \frac{1}{8} \\ \frac{1}{8} \\ \hline \frac{2}{8} = \frac{1}{4} \end{array}$$

Always reduce the fraction in the answer to its lowest terms.

Exercises

1. John has $\frac{3}{8}$ lb. of copper wire. If he buys $\frac{1}{8}$ lb. more, how much will he then have?

2. Draw a line $\frac{3}{8}$ in. long. Add $\frac{3}{8}$ in. to it. How long is the line then?

3. Ruth has $\frac{1}{4}$ lb. of almonds and $\frac{1}{4}$ lb. of butternuts. How much do all the nuts weigh?

4. Fred walks $\frac{3}{8}$ mile to Joe's house. Then he walks $\frac{5}{8}$ mile more to the pond. How far does he walk in all?

Add, reducing all fractions in the answers to lowest terms. Check the work by going over it again:

5. $\frac{2}{8}$ $\frac{2}{8}$	**8.** $\frac{1}{8}$ $\frac{3}{8}$	**11.** $\frac{3}{4}$ $\frac{3}{4}$	**14.** $1\frac{3}{8}$ $1\frac{1}{8}$	**17.** $3\frac{3}{8}$ $2\frac{5}{8}$
6. $\frac{3}{8}$ $\frac{3}{8}$	**9.** $\frac{5}{8}$ $\frac{1}{8}$	**12.** $\frac{7}{8}$ $\frac{7}{8}$	**15.** $4\frac{1}{4}$ $3\frac{1}{4}$	**18.** $5\frac{3}{8}$ $3\frac{7}{8}$
7. $\frac{1}{4}$ $\frac{1}{4}$	**10.** $\frac{2}{8}$ $\frac{4}{8}$	**13.** $\frac{5}{8}$ $\frac{5}{8}$	**16.** $8\frac{1}{8}$ $2\frac{5}{8}$	**19.** $4\frac{5}{8}$ $3\frac{7}{8}$

ADDING HALVES, FOURTHS, AND EIGHTHS

1. Ida buys $\frac{3}{4}$ yd. of red silk and $\frac{3}{8}$ yd. of blue silk for a flag. How much silk does she buy?

You know that you can add only things that have the same name. You cannot add $\frac{3}{4}$ and $\frac{3}{8}$, as they stand, because 3 *fourths* and 3 *eighths* have different names. But $\frac{3}{4} = \frac{6}{8}$; hence you can change $\frac{3}{4}$ to $\frac{6}{8}$.

$$\frac{3}{4} = \frac{6}{8}$$
$$\frac{3}{8} = \frac{3}{8}$$
$$\frac{9}{8} = 1\frac{1}{8}$$

Have $\frac{6}{8}$ and $\frac{3}{8}$ the same name? How many eighths are 6 *eighths* and 3 *eighths?*

Ida buys $\frac{9}{8}$ yd. of silk, which equals $1\frac{1}{8}$ yd.

2. Rose has $\frac{7}{8}$ lb. of butter. She buys $\frac{1}{2}$ lb. more. How much butter has she then?

Do $\frac{1}{2}$ and $\frac{7}{8}$ have the same name? Change $\frac{1}{2}$ to $\frac{4}{8}$. Can you add now?

$$\frac{1}{2} = \frac{4}{8}$$
$$\frac{7}{8} = \frac{7}{8}$$
$$\frac{11}{8} = 1\frac{3}{8}$$

To add fourths and eighths, change the fourths to eighths. To add halves and eighths, change the halves to eighths.

Exercises

Add. In the answers reduce improper fractions to mixed numbers, and other fractions to lowest terms:

1. $\frac{1}{8}$ $\frac{1}{2}$	2. $\frac{1}{2}$ $\frac{3}{8}$	3. $\frac{1}{4}$ $\frac{5}{8}$	4. $\frac{5}{8}$ $\frac{1}{2}$	5. $\frac{5}{8}$ $\frac{3}{4}$
6. $\frac{1}{8}$ $\frac{3}{4}$	7. $\frac{1}{4}$ $\frac{3}{8}$	8. $\frac{7}{8}$ $\frac{1}{4}$	9. $\frac{1}{2}$ $\frac{3}{4}$	10. $\frac{1}{2}$ $\frac{1}{4}$
11. $\frac{5}{8}$ $\frac{1}{4}$ $\frac{1}{8}$	12. $\frac{7}{8}$ $\frac{1}{4}$ $\frac{3}{8}$	13. $\frac{1}{8}$ $\frac{1}{2}$ $\frac{5}{8}$	14. $\frac{7}{8}$ $\frac{3}{4}$ $\frac{5}{8}$	15. $\frac{3}{8}$ $\frac{1}{4}$ $\frac{1}{8}$

USING MIXED NUMBERS

Harry works at the market on Saturdays. Last Saturday he delivered to Mrs. Dane a chicken weighing $4\frac{1}{2}$ lb. and $2\frac{5}{8}$ lb. of steak. How much in all did this meat weigh?

$$\begin{array}{r} 4\frac{1}{2} = 4\frac{4}{8} \\ 2\frac{5}{8} = 2\frac{5}{8} \\ \hline 7\frac{1}{8} \end{array}$$

Write $2\frac{5}{8}$ under $4\frac{1}{2}$. Change $4\frac{1}{2}$ to $4\frac{4}{8}$. Then think "$\frac{5}{8} + \frac{4}{8} = \frac{9}{8}$, or $1\frac{1}{8}$." Write $\frac{1}{8}$ under the line and carry 1.

Think "1 (carried) + 2 + 4 = 7." Write 7.

Mrs. Dane's meat weighed $7\frac{1}{8}$ lb.

Exercises

Arrange the work in each problem as shown above.

1. Harry delivered $7\frac{1}{2}$ lb. of roast beef and $1\frac{3}{4}$ lb. of lamb chops to Mrs. Law. How much did that bundle weigh?

2. How much do $4\frac{1}{2}$ lb. of leg of lamb and $1\frac{3}{8}$ lb. of bacon weigh?

Add. Check the work by going over it again:

3. $2\frac{3}{4}$	**4.** $7\frac{3}{8}$	**5.** $2\frac{7}{8}$	**6.** $4\frac{5}{8}$	**7.** $2\frac{3}{8}$
$8\frac{1}{2}$	$8\frac{7}{8}$	$4\frac{1}{2}$	$2\frac{5}{8}$	$4\frac{3}{4}$
8. $7\frac{1}{2}$	**9.** $2\frac{1}{4}$	**10.** $5\frac{7}{8}$	**11.** $8\frac{3}{4}$	**12.** $6\frac{1}{2}$
$3\frac{1}{8}$	$9\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{5}{8}$	$8\frac{7}{8}$
13. $2\frac{1}{8}$	**14.** $1\frac{1}{8}$	**15.** $9\frac{5}{8}$	**16.** $7\frac{1}{2}$	**17.** $1\frac{3}{8}$
$2\frac{1}{4}$	$8\frac{3}{4}$	$4\frac{3}{4}$	$6\frac{3}{8}$	$5\frac{3}{4}$
$3\frac{5}{8}$	$2\frac{3}{8}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{5}{8}$

REVIEW OF ADDITION

Copy and add the following. Check the work:

1.	2.	3.	4.	5.	6.
14	42	46	82	23	97
86	85	21	68	20	79
27	39	58	16	53	33
34	78	94	61	13	67
70	86	29	76	95	80
75	34	30	50	29	51
56	20	77	99	38	78
51	95	15	45	94	60
97	46	29	30	18	14
79	76	89	69	42	61

Add without copying. Practice until you can do and check 4 of the following examples in 8 minutes:

7.	8.	9.	10.
7047	2468	1624	5862
9530	8599	2184	6323
6985	3334	5956	3876
1229	6400	1736	9792
5803	4959	4102	5518
7756	9757	3840	1703
8688	6238	8848	7410

11.	12.	13.	14.
9972	2467	4242	2247
2384	9601	3256	5304
6130	7094	9798	8943
1051	9936	1053	8726
8787	2370	1224	7408
6714	1155	4803	9615
9688	8538	9630	3090

REVIEW OF SUBTRACTION

1. The population of Lakeville was 26,700 one year and 23,483 ten years later. How much less was the population in the later year than in the earlier year?

2. On a certain railroad the distance from Chicago to Omaha is 488 miles, while from Chicago to San Francisco it is 2261 miles. On a trip from Chicago to San Francisco, how many miles farther do you have to travel after you reach Omaha?

3. Mr. Lane bought a house for $15,000, on which he paid $4750 in cash. How much did he still owe?

Subtract without copying. Practice until you can do and check 6 of the following examples in 5 minutes:

4. $8844.61 970.78	9. $6689.12 704.64	14. $5344.43 742.59
5. $3611.90 677.33	10. $6831.10 685.30	15. $1616.38 199.46
6. $8506.72 1524.89	11. $8490.19 2879.40	16. $8519.51 2251.99
7. $9828.33 7735.68	12. $4918.23 1523.66	17. $6700.00 5332.15
8. $6361.93 2998.63	13. $9404.89 5736.92	18. $6000.00 3415.45

SUBTRACTING FRACTIONS WITH LIKE NAMES

1. You have seen that you can add fractions that have the same denominator. You can also subtract fractions that have the same denominator.

2. Will has $\frac{3}{4}$ of an apple. He gives $\frac{1}{4}$ of the apple to Roy. How many fourths of the apple has Will left?

To find $\frac{3}{4} - \frac{1}{4}$, think of $\frac{3}{4}$ as 3 *fourths* and think of $\frac{1}{4}$ as 1 *fourth*. Then think "$\frac{1}{4}$ and $\frac{2}{4} = \frac{3}{4}$." Write $\frac{2}{4}$ below the line. Then reduce $\frac{2}{4}$ to $\frac{1}{2}$.

Will has $\frac{1}{2}$ of the apple left.

Think this:	*Write this:*
3 fourths	$\frac{3}{4}$
1 fourth	$\frac{1}{4}$
2 fourths	$\frac{2}{4}$, or $\frac{1}{2}$

Exercises

1. Can you subtract these? If so, do it.

5 eighths $\frac{5}{8}$	3 fourths $\frac{3}{4}$	7 eighths $\frac{7}{8}$
2 eighths $\frac{2}{8}$	2 fourths $\frac{2}{4}$	6 eighths $\frac{6}{8}$

2. If you buy $\frac{5}{8}$ yd. of ribbon and use $\frac{1}{8}$ yd. of it, what part of a yard is left?

Subtract. Reduce all answers to their lowest terms:

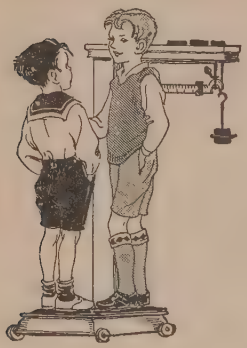
3. $\frac{2}{4}$	**5.** $\frac{4}{8}$	**7.** $\frac{4}{4}$	**9.** $\frac{7}{8}$	**11.** $\frac{8}{8}$	**13.** $\frac{5}{4}$
$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{8}$	$\frac{3}{4}$
4. $\frac{7}{8}$	**6.** $\frac{7}{8}$	**8.** $\frac{5}{8}$	**10.** $\frac{7}{8}$	**12.** $1\frac{3}{8}$	**14.** $\frac{2}{2}$
$\frac{4}{8}$	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$

15. *What must you add to each of these fractions to make* 1? (*Think of* 1 *as* $\frac{2}{2}$ *or* $\frac{3}{3}$ *or* $\frac{4}{4}$ *or* $\frac{8}{8}$.)

$\frac{3}{4}$ $\frac{7}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{8}$ $\frac{2}{3}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{6}{8}$

COMPARING WEIGHTS

1. Howard and Dan are standing on the scales together. They weigh $146\frac{3}{4}$ lb. Dan alone weighs $81\frac{1}{4}$ lb. How heavy is Howard?



2. Bob weighs $73\frac{5}{8}$ lb. His brother Gus weighs $75\frac{7}{8}$ lb. Which boy is heavier? how much heavier?

3. The average weight of the children in John's class is $71\frac{1}{4}$ lb. John weighs $72\frac{3}{4}$ lb. How much above the average weight is John?

4. Martin is in John's class. His weight is $4\frac{1}{4}$ lb. below the average weight of the class (see ex. 3). Find Martin's weight.

5. Edward is in John's class. He weighs $85\frac{3}{4}$ lb. How much above the average does he weigh?

Subtract. Check the work by going over it again:

6. $4\frac{5}{8}$ $2\frac{1}{8}$	**9.** $8\frac{2}{3}$ $3\frac{1}{3}$	**12.** $2\frac{3}{8}$ $1\frac{1}{8}$	**15.** $8\frac{1}{2}$ $7\frac{1}{2}$	**18.** $7\frac{1}{4}$ $1\frac{1}{4}$
7. $6\frac{3}{8}$ $5\frac{2}{8}$	**10.** $9\frac{3}{4}$ $7\frac{1}{4}$	**13.** $4\frac{1}{4}$ 2	**16.** $6\frac{7}{8}$ $3\frac{1}{8}$	**19.** $3\frac{5}{8}$ $2\frac{3}{8}$
8. $5\frac{3}{4}$ $2\frac{2}{4}$	**11.** $6\frac{5}{8}$ $2\frac{2}{8}$	**14.** $7\frac{6}{8}$ $2\frac{3}{8}$	**17.** $6\frac{5}{6}$ $3\frac{1}{6}$	**20.** $4\frac{7}{8}$ $3\frac{3}{8}$

HOW FAST CAN YOU RUN?

1. Tom runs around the outdoor track in $3\frac{1}{4}$ minutes. Arnold takes $4\frac{1}{2}$ minutes to run the same distance. How much longer does Arnold take than Tom?

You cannot subtract $\frac{1}{4}$ from $\frac{1}{2}$ because they have different names. You must first change $\frac{1}{2}$ to $\frac{2}{4}$. Subtracting $3\frac{1}{4}$ from $4\frac{2}{4}$, you get $1\frac{1}{4}$. Hence Arnold takes $1\frac{1}{4}$ minutes longer than Tom to run around the track.

$$\begin{array}{r} 4\frac{1}{2} = 4\frac{2}{4} \\ 3\frac{1}{4} = 3\frac{1}{4} \\ \hline 1\frac{1}{4} \end{array}$$

2. Little Bill runs around the track in $5\frac{3}{8}$ minutes. How much longer than Tom does he take?

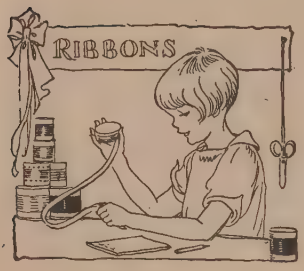
3. Harry runs the same distance in $3\frac{1}{8}$ minutes. How much less is his time than Tom's?

Exercises

Subtract. Check the work by going over it again:

1. $\frac{3}{4}$ $\frac{1}{2}$	**6.** $2\frac{5}{8}$ $1\frac{1}{2}$	**11.** $9\frac{1}{2}$ $5\frac{1}{8}$	**16.** $8\frac{7}{8}$ $6\frac{3}{4}$	**21.** $6\frac{7}{8}$ 5
2. $\frac{1}{4}$ $\frac{1}{8}$	**7.** $7\frac{3}{4}$ $2\frac{1}{2}$	**12.** $6\frac{1}{2}$ $3\frac{1}{4}$	**17.** $5\frac{3}{4}$ $3\frac{3}{8}$	**22.** $7\frac{3}{4}$ $2\frac{1}{8}$
3. $\frac{5}{4}$ $\frac{3}{8}$	**8.** $4\frac{7}{8}$ $2\frac{1}{2}$	**13.** $3\frac{3}{4}$ $2\frac{1}{8}$	**18.** $3\frac{3}{8}$ $3\frac{1}{8}$	**23.** $2\frac{1}{2}$ $2\frac{1}{4}$
4. $\frac{3}{4}$ $\frac{5}{8}$	**9.** $9\frac{3}{8}$ $3\frac{1}{4}$	**14.** $7\frac{1}{2}$ $2\frac{3}{8}$	**19.** $2\frac{1}{4}$ $\frac{1}{8}$	**24.** $6\frac{5}{8}$ $2\frac{1}{4}$
5. $\frac{1}{2}$ $\frac{3}{8}$	**10.** $6\frac{7}{8}$ $5\frac{3}{4}$	**15.** $9\frac{1}{4}$ $6\frac{1}{8}$	**20.** $8\frac{3}{4}$ $2\frac{5}{8}$	**25.** $6\frac{7}{8}$ $2\frac{1}{4}$

SELLING RIBBON AT THE FAIR



Anna is selling ribbon at the fair. Each day she keeps a record of her sales. When she sells $4\frac{1}{2}$ yd. of red ribbon, she writes $4\frac{1}{2}$ under the word "Red." When she sells $2\frac{3}{8}$ yd. of white ribbon, she writes $2\frac{3}{8}$ under "White."

This is Anna's record for to-day:

Red	*Blue*	*Yellow*	*White*	*Pink*	*Green*
$4\frac{1}{2}$	$5\frac{3}{8}$	$1\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$1\frac{1}{2}$
2	3	$4\frac{3}{4}$	$1\frac{1}{8}$	3	$2\frac{3}{8}$
$3\frac{1}{4}$	1	5	4	$1\frac{3}{4}$	$4\frac{7}{8}$
7	$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$

1. How many yards of red ribbon did Anna sell to-day? how many yards of each of the other colors?

2. How many yards of ribbon did Anna sell in all to-day? If she charged 24¢ a yard for each color, how much money did she take in?

Counting by Fractions

1. Count by $\frac{1}{2}$'s to 8, beginning $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2.
2. Count by $\frac{1}{3}$'s to 6, beginning $\frac{1}{3}$, $\frac{2}{3}$, 1, $1\frac{1}{3}$, $1\frac{2}{3}$.
3. Count by $\frac{1}{4}$'s to 6, beginning $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$.
4. Count by $\frac{1}{8}$'s to 5, beginning $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$.

Remember that $\frac{2}{8} = \frac{1}{4}$, $\frac{4}{8} = \frac{1}{2}$, $\frac{6}{8} = \frac{3}{4}$, and $\frac{8}{8} = 1$.

312
289
53

FRACTIONS IN THE QUOTIENT

At a remnant sale Mrs. Root bought a 4-yard piece of silk for $2.62. How much did it cost a yard?

Dividing $2.62 by 4, you get $.65, with a remainder of 2. If you write this remainder over the divisor, you get $\frac{2}{4}$, which reduces to $\frac{1}{2}$. Mrs. Root paid $.65$\frac{1}{2}$ a yard.

$$4\overline{)\$2.62}$$
$$\$\ .65\tfrac{2}{4} = \$.65\tfrac{1}{2}$$

Exercises

In each problem, write the remainder over the divisor to form a fraction. Reduce the fraction to lowest terms:

1. Miss Allen bought a 4-yard piece of serge for $3.02. How much did she pay per yard?

2. Betty paid $.70 for a piece of lace to trim her dress. She measured it and found that it was exactly 8 ft. long. How much did the lace cost per foot?

3. Jane bought a 6-yard piece of linen for $2.97. What was the price per yard?

Divide the following. Check the work by multiplying:

4. $8\overline{)60}$	7. $8\overline{)78}$	10. $4\overline{)150}$	13. $8\overline{)804}$	16. $6\overline{)274}$
5. $4\overline{)98}$	8. $8\overline{)90}$	11. $8\overline{)258}$	14. $6\overline{)254}$	17. $8\overline{)442}$
6. $4\overline{)63}$	9. $4\overline{)94}$	12. $6\overline{)135}$	15. $9\overline{)921}$	18. $4\overline{)654}$

19. Paul's father earns $5.00 a day. If he works 8 hr. a day, how much does he earn in an hour?

20. Mr. Crane drove 1158 miles in his car in 8 days. How many miles did he average each day?

WHEN DID TOBY GET HIS SUPPER?

1. At 2 P.M. last Saturday Mr. Smithers told his son Toby that he would have to do 16 examples before he could have any supper. Toby thought that he had plenty of time and went out at once to play handball with his friend. After $1\frac{3}{4}$ hr. he came home hungry. He found $\frac{1}{2}$ dozen biscuits in the pantry and carried off $\frac{2}{3}$ of them, with a jar of jam. It took $\frac{1}{4}$ hr. to finish the biscuits and the jam. What time was it then? How many biscuits did he eat?

2. Toby then did $\frac{1}{4}$ of the 16 examples in $\frac{1}{2}$ hr. The next hour he did only $\frac{1}{4}$ of the remaining examples because he was playing with the dog. How late was it then? How many examples had Toby still to do?

3. Toby now did $\frac{1}{3}$ of the remaining examples on the front porch in $\frac{3}{4}$ hr. Suddenly Uncle Joe drove by. Toby climbed into the car, taking his examples with him. In $\frac{1}{4}$ hr. they reached Uncle Joe's house. What time was it then?

4. Toby at once began to finish the examples. They took $2\frac{1}{2}$ min. each. As soon as they were finished, Toby had supper with Uncle Joe. At what time did Toby start to eat his supper?

SOLVING HARD PROBLEMS

The pupils in our class want to earn money to buy some pictures. They divide into two teams to sell magazine subscriptions. On each subscription they make \$.50 profit. Team *A* gets 42 subscriptions. Team *B* makes a profit of \$18.50. How much more money does one team make than the other?

To help you in solving a hard problem like this, you should ask yourself these questions:

1. *What does the problem mean?* Make sure that you know the meaning of all the words in the problem, like " subscription " and " profit."

2. *What is to be found?* You must find how much more one team makes than the other team.

3. *How can the numbers given in the problem be used to get the answer?* You take these two steps:

First Step: Team *A* makes \$.50 on each of 42 subscriptions. Since $42 \times \$.50 = \$21.00$, Team *A* makes \$21.00.

Second Step: Team *B* makes \$18.50. Subtract \$18.50 from \$21. You find that Team *A* makes \$2.50 more than Team *B*. The answer is \$2.50.

First Step

\$.50
42
1 00
20 0
\$21.00

Second Step

\$21.00
18.50
\$ 2.50

4. *Is the work right?* Check the multiplication and the subtraction. Read the problem again to see if your answer tells what you were asked to find.

SOME PROBLEMS TO MAKE YOU THINK

In solving each of the following problems, ask yourself the four questions given on page 291.

1. Three children buy their mother a Christmas present for $2.00, their father a present for $1.50, and their uncle a present for $1.30. How much must each child pay if they share the expense equally?

2. Edward sells 48 glasses of lemonade at 3¢ a glass. He pays 40¢ for the lemons and his mother furnishes the sugar. How much is Edward's profit?

3. Our baseball manager buys 2 baseballs at $.75 each, 3 bats at $1.25 each, 1 mitt for $3.90, and 1 glove for $1.47. How much does he pay in all?

4. Harry wants a bicycle that costs $35.15. He has $8.55 which his uncle gave him, $3.55 which he earned, and he receives $12 for his birthday. How much more money must Harry get before he can buy the bicycle?

5. A family went on an automobile trip for 6 days. They rode 200 miles the first day, 189 miles the second day, and 196 miles the third day. The last 3 days they went as many miles as they had gone the first 3 days. How far did they go in all?

6. Mary buys 5¢ worth of jelly beans at 5 for 1¢ and 10¢ worth of lollipops at 1¢ each. Paul buys 24 mints; he also gets 5¢ worth of gumdrops at 2 for 1¢. How many pieces of candy do both buy in all?

EDITH'S CHICKENS

1. Edith spent \$12.60 for baby chickens at 15¢ each. How many chickens did she buy?

Remember that \$12.60 = 1260¢.

2. A rat killed 6 of Edith's chickens and 12 chickens died. All the others lived. How many chickens did Edith raise?

3. Edith read in a book that it takes 34 lb. of feed to raise each chicken. How many pounds of feed did she need to raise 66 chickens? At 3¢ a pound how much did the feed cost?

4. Edith's other expenses amounted to \$12.06. Adding this amount to the expenses in ex. 1 and 3, find her total expenses.

5. When the chickens were raised, Edith sold 28 of them. These weighed 142 lb. in all. How much did she receive for them at 32¢ a pound?

6. Edith kept 38 chickens to lay eggs. If each of them was worth \$3.25, how much were the 38 chickens worth?

7. The answer to ex. 4 gives Edith's total expenses. The total value of the chickens she sold and of the ones she kept was \$168.94. What was her profit?

After this Edith's profit will be still greater because the chickens will lay eggs which she can sell.

HOURS AND MINUTES

1. How many hands has this watch? To what number is the minute hand pointing? the hour hand? the second hand? What time does the watch show?

2. Each small space on the edge of the seconds' dial shows 1 second. How many times does the second hand go around in 1 minute? How many seconds make 1 minute?

3. Remember the following table of *time:*

60 seconds (sec.)	= 1 minute (min.)
60 minutes (min.)	= 1 hour (hr.)
24 hours (hr.)	= 1 day (da.)

4. We write 37 minutes past 8 like this: 8.37 or 8 : 37 or 8 37. If the time by Irma's watch is 8.37 and the right time is 8.43, how slow is Irma's watch?

5. Henry went to play at 2.40. He had to be back at 3.30. How many minutes had he to play?

6. Ben runs around the school yard in 55 sec., Sam in 58 sec., and Nat in 1 min. 4 sec. How much longer does Nat take than Sam? than Ben?

Tell what numbers should be put in place of the dots:

7. $\frac{1}{2}$ hr. = . . . min.

8. $\frac{3}{4}$ hr. = . . . min.

9. 4 hr. = . . . min.

10. 2 min. = . . . sec.

11. $\frac{1}{4}$ min. = . . . sec.

12. $1\frac{1}{2}$ min. = . . . sec.

TRAVELING BY TRAIN

1. Each day begins at 12 o'clock midnight. From 12 o'clock midnight to 12 o'clock noon is called *morning* and is written A.M. From 12 o'clock noon to 12 o'clock midnight is called *afternoon* and is written P.M.

2. A train leaves Chicago at 2.10 A.M. Is this in the morning or in the afternoon?

3. Charles went to meet his mother, who was coming home on Train No. 16. When he reached the station, he read this:

TRAIN BULLETIN

TRAIN	DUE	WILL ARRIVE
No. 16	1.35 P.M.	2.50 P.M.
No. 4	1.40 P.M.	2.30 P.M.
No. 23	2.15 P.M.	2.50 P.M.

Charles saw that his mother's train was due at 1.35 P.M., but would arrive at 2.50 P.M. Charles thought, "From 1.35 to 2.35 is 1 hr. From 2.35 to 2.50 is 15 min. Then the train is 1 hr. 15 min. late." Was he right?

4. How late was each of the other trains?

5. If you want to travel from Philadelphia to Washington, D. C., in the quickest time, which of these trains should you take?

TRAIN	No. 405	No. 181	No. 127
Leaves Philadelphia	7.25 A.M.	11.14 A.M.	5.00 P.M.
Arrives Washington	10.30 A.M.	2.15 P.M.	7.45 P.M.

MONTHS

1. Name the months of the year, beginning with January. How many months are there in a year?

2. What names do these abbreviations stand for: Jan., Apr., Feb., Mar., Aug., Nov., Sept., Dec., Oct.?

3. Learn this table of *time:*

7 days (da.)	= 1 week (wk.)
About 52 weeks (wk.)	= 1 year (yr.)
12 months (mo.) or 365 days	= 1 year
366 days (da.)	= 1 leap year
100 years (yr.)	= 1 century

4. Leap years come every 4 years and can be divided exactly by 4.

Thus, 1928 and 1932 are leap years; but the century years, such as 1900 and 2000, are leap years only when exactly divisible by 400.

5. February has 28 days each year except in a leap year. In leap years it has 29 days. How many days had February in 1924? in 1927?

6. Memorize this rime:

Thirty days have September,
April, June, and November;
All the rest have thirty-one,
Except the second month alone,
To which we twenty-eight assign
Till leap year gives it twenty-nine.

7. Name each month that has 31 da.; 30 da.

8. Which month has less than 30 days?

MONTHS AND DAYS

1. Tell on what date each of these days comes:

New Year's Day	Decoration Day
Lincoln's Birthday	Independence Day
Washington's Birthday	Columbus Day
St. Valentine's Day	Christmas

2. How many days after Christmas is New Year's Day?

3. Thanksgiving Day is the last Thursday in November. On what date is Thanksgiving Day this year?

4. On what date is Easter Sunday this year?

5. When does Labor Day come this year?

6. On what date does your school close for the summer this year? On what date does it open again next fall? How many days of vacation will you have? How many weeks and days is that?

7. How many days longer than 4 weeks is a 30-day month? a 31-day month?

8. Last spring John's uncle was away on a business trip from March 2 to April 4. How many days was he away?

Count April 4, but do not count March 2.

9. Jessie was born April 15, 1918. How old was she on April 15, 1928? How old will she be on April 15, 1942?

10. Louise was born on Oct. 25, 1921. How many years and months old will she be next Christmas?

MILES AND RODS

To measure long distances out of doors, we often use the *rod* and the *mile*. A farmer may use the rod to measure the length of a field or the distance he lives from his neighbor. Very long distances, like the distance between two cities, are measured in miles.

1. One rod is $5\frac{1}{2}$ yd. long. How many feet are there in 1 rod?

2. There are 320 rods in 1 mile. How many yards are there in 1 mile? how many feet?

3. Learn this table of *length:*

12 inches (in.)	= 1 foot (ft.)
3 feet (ft.)	= 1 yard (yd.)
$5\frac{1}{2}$ yd. or $16\frac{1}{2}$ ft.	= 1 rod (rd.)
320 rd. or 5280 ft.	= 1 mile (mi.)

4. Stand about a rod away from the door of your classroom, estimating the distance as nearly as you can. Then measure the distance with a yardstick to see how nearly correct you are. How many yards and feet make 1 rod?

5. Estimate in rods the length and the width of your school yard. Test your estimate by measuring the yard.

6. In the Field Day exercises Jack ran in the 100-yard dash. How many feet did he run?

COMPARING DISTANCES

1. Cities are often laid off in blocks that are 16 rd. long. How many feet are there in such a block? How many such blocks make 1 mi.?

2. Harry walks 10 blocks to school every morning. What part of a mile is that? How many miles does he walk at noon if he walks home to lunch and back?

3. Try to find out how many feet long the blocks in your town or city are. How many of these blocks make 1 mi.? Do you live about $\frac{1}{4}$ mi., $\frac{1}{2}$ mi., $\frac{3}{4}$ mi., 1 mi., or more from your school?

4. Hazel walks to school in $\frac{1}{2}$ hr. She can walk 3 mi. an hour. How far from school does she live?

5. The boys of our school had a $\frac{1}{4}$-mile race. How many rods did they run? how many yards?

6. An ocean liner is 880 ft. long. How many such liners, put end to end, would make 1 mi.?

7. The Brooklyn Bridge is 6016 ft. long. How many feet longer than 1 mile is it?

. Tell what numbers should be put in place of the dots:

8.	$\frac{1}{2}$ mi. = . . rd.	8 yd. = . . ft.	2 mi. = . . ft.
9.	$\frac{1}{4}$ mi. = . . rd.	6 rd. = . . yd.	240 ft. = . . yd.
10.	3 mi. = . . ft.	4 yd. = . . in.	240 in. = . . ft.
11.	$\frac{1}{2}$ mi. = . . ft.	$\frac{1}{4}$ mi. = . . ft.	640 rd. = . . mi.
12.	$\frac{1}{2}$ mi. = . . yd.	$\frac{1}{8}$ mi. = . . ft.	110 yd. = . . ft.

PERIMETERS

1. Roland is buying wire fence to put around his garden. The diagram at the left shows how many feet long each side of the garden is. How many feet of fence does Roland need?

$$\begin{array}{r} 30 \\ 18 \\ 30 \\ 18 \\ \hline 96 \end{array}$$

The distance around the garden is 96 ft.; hence Roland needs 96 ft. of fence.

The distance around the garden is called the **perimeter** of the garden. You see that the perimeter is found by adding together the number of feet on each side.

2. At 5¢ a foot, how much will Roland pay for 96 ft. of fence?

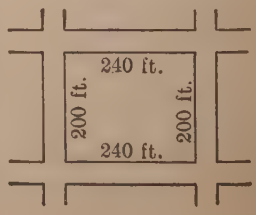
Multiply the easier way. What does 480¢ equal?

3. William's garden has 4 sides, each side being 25 ft. long. What is the perimeter of this garden?

4. At 4¢ a foot, find the cost of enough wire fence to go all around William's garden.

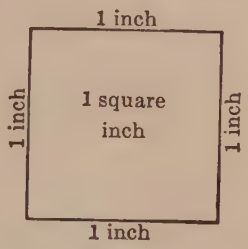
5. Measure your school yard. Find its perimeter.

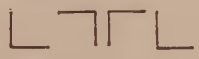
6. This is a picture of the block in which Charles lives. What is the distance in feet around this block? How many times would Charles have to run around this block to run a mile?



STUDYING SQUARES AND RECTANGLES

1. The figure at the right is a **square.** Measure it with your ruler. You find that each side is 1 in. long. Then this is a 1-*inch square.* We say that the **area** of this figure is 1 *square inch.*



2. The corners of a square look like this:  These corners are called *square corners* or *right angles.*

The corners of a square are all right angles.

3. Tell which of these are right angles:

4. Draw and cut out a square 2 in. long on each side. This is a 2-inch square. Now fold it into square inches. How many square inches does a 2-inch square contain? Then the area of a 2-inch square is 4 square inches.

5. Find the area of a 3-inch square; of a 4-inch square; of a 5-inch square.

6. This is a **rectangle.** How many sides has it? Are the sides of this rectangle all of the same length? How many right angles has a rectangle?

7. Point out four rectangles in your schoolroom.

FINDING THE AREA OF A RECTANGLE

1. Draw a rectangle 4 in. long and 2 in. wide.

Mark off the inches on each side and draw dotted lines, as in the figure at the left. This divides the rectangle into square inches.

You can find the area of this rectangle by counting the square inches. Another way to find the area is to think: "There are 4 square inches in each long row and there are 2 long rows." Hence the area is:

2×4 square inches, or 8 square inches

2. Draw a rectangle 5 in. long and 3 in. wide. It contains 3 long rows, with 5 square inches in each. Hence the area of this rectangle is 3×5 square inches, or 15 square inches.

You see that in a rectangle the *length in inches times the width in inches gives the area in square inches.*

Is the rectangle in ex. 2 larger than the one in ex. 1? *The area of a rectangle tells how large it is.*

3. If a rectangle is 5 in. long and 2 in. wide, we say that it measures 5 in. by 2 in.

Find the area of each of these rectangles:

4. 6 in. by 2 in.
5. 5 in. by 4 in.
6. 7 in. by 3 in.
7. 6 in. by 4 in.
8. 8 in. by 3 in.
9. 7 in. by 1 in.
10. 10 in. by 6 in.
11. 12 in. by 7 in.
12. 14 in. by 5 in.
13. 17 in. by 6 in.
14. 13 in. by 8 in.
15. 15 in. by 7 in.

SQUARE FEET

1. To measure the area of a large rectangle, like a blackboard, a square inch is too small. You must therefore use a larger unit, such as a square foot. A **square foot** is a square that has each side 1 ft. long. Its area is 1 square foot.

2. Draw a square foot on the blackboard. Do you see anything in the room that is about one square foot in area?

3. Our blackboard is 12 ft. long and 4 ft. wide. Then its area is 4×12 square feet, or 48 square feet.

4. How many feet long and how many feet wide is the blackboard in your room? What is its area?

5. A table has a marble top 5 ft. long and 3 ft. wide. How many square feet of marble is that?

Find the areas of rectangles that measure as follows:

6. 9 ft. by 8 ft.
7. 7 ft. by 2 ft.
8. 6 ft. by 5 ft.
9. 6 ft. by 3 ft.
10. 8 ft. by 4 ft.
11. 7 ft. by 1 ft.
12. 11 ft. by 4 ft.
13. 10 ft. by 3 ft.
14. 13 ft. by 7 ft.
15. 19 ft. by 4 ft.
16. 18 ft. by 7 ft.
17. 24 ft. by 15 ft.

18. Ruth's room is 12 ft. by 10 ft. Helen's room is 11 ft. by 11 ft. Whose room is larger, and how much larger?

19. Jack is varnishing the floor of his mother's living room. It measures 14 ft. by 12 ft. How many square feet has Jack to varnish?

MEASURING A WALK

1. Mr. Sloan is laying a walk in front of his house. It is to be 2 yd. wide and 16 yd. long. What is its area?

To measure the area of a very large rectangle, like a walk or a floor, the square yard is often used. A **square yard** is a square that has each side 1 yd. long.

The walk contains 2×16 square yards, or 32 square yards.

2. How much will it cost to lay the walk in ex. 1 at \$2.35 per square yard?

3. How many square yards are there in a walk 1 yd. wide and 14 yd. long? in a walk 2 yd. by 23 yd.?

Find the number of square yards in these rectangles:

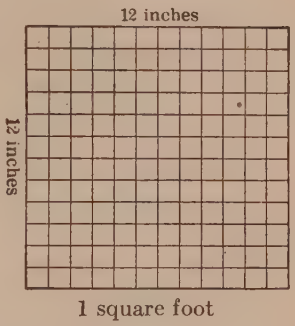
4. 7 yd. by 2 yd.
5. 3 yd. by 1 yd.
6. 6 yd. by 2 yd.
7. 3 yd. by 3 yd.
8. 9 yd. by 7 yd.
9. 1 yd. by 1 yd.
10. 9 yd. by 1 yd.
11. 13 yd. by 11 yd.
12. 27 yd. by 14 yd.
13. 21 yd. by 13 yd.

14. If a rectangle measures 5 in. by 4 in., its area is 20 sq. in. What is the area if it measures 5 ft. by 4 ft.? 5 yd. by 4 yd.?

In finding areas, the numbers you multiply must always have the same name.

COMPARING SQUARE INCHES AND SQUARE FEET

1. Draw a square measuring 1 ft. on each side. Mark off each side in inches and draw lines, as in the figure on the right, to divide the square into square inches. How many square inches equal 1 square foot?



2. On the blackboard draw a square measuring 1 yd. on each side. Divide the square into square feet. How many square feet equal 1 square yard?

3. Remember this table of *square measure:*

144 square inches (sq. in.) = 1 square foot (sq. ft.)
9 square feet (sq. ft.) = 1 square yard (sq. yd.)

4. The area of Mrs. Drew's kitchen floor is 108 sq. ft. How many square yards is that?

Since it takes 9 sq. ft. to make 1 sq. yd., divide 108 by 9 to find the number of square yards.

5. How many square yards of linoleum does it take to cover a floor 4 yd. long and 3 yd. wide?

Tell what numbers should be put in place of the dots:

6. 1 sq. ft. = . . . sq. in.

7. $\frac{1}{2}$ sq. ft. = . . . sq. in.

8. 3 sq. ft. = . . . sq. in.

9. 2 sq. yd. = . . . sq. ft.

10. 27 sq. ft. = . . . sq. yd.

11. 288 sq. in. = . . . sq. ft.

HOW TO MAKE DRAWINGS TO SCALE

1. Betty has a rectangular tulip bed 6 ft. long and 2 ft. wide. Make a drawing of this bed, letting 1 in. on your drawing stand for 1 ft.

This is called **drawing to scale.**

How long should the tulip bed be on your drawing? How wide should it be?

2. Betty's strawberry patch is 7 ft. long and 5 ft. wide. Make a drawing of it, letting 1 in. stand for 1 ft.

3. Frank's garden is 4 yd. long and 3 yd. wide. Make a drawing of it, letting 1 in. stand for 1 yd.

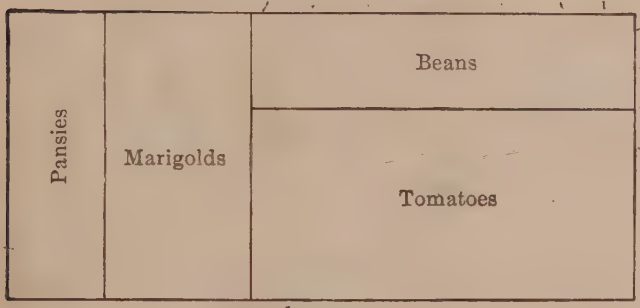
4. In the woods John is building a hut 8 ft. long and 4 ft. wide. He wants to make a drawing of the floor of the hut, letting $\frac{1}{4}$ in. stand for 1 ft. To do this he thinks, "Since $\frac{1}{4}$ in. stands for 1 ft., then 1 in. stands for 4 ft. and 2 in. stand for 8 ft." Hence he makes the drawing 1 in. wide and 2 in. long. Does he make the drawing the right length and width?

5. Louis is building a canoe shed 8 ft. by 16 ft. Make a drawing of it, letting $\frac{1}{4}$ in. stand for 1 ft. How many feet will 1 in. stand for? 2 in.? 4 in.?

6. Mr. Dunn has a cornfield 4 rd. by 12 rd. Make a drawing of the field, letting $\frac{1}{4}$ in. stand for 1 rd.

7. If you let $\frac{1}{2}$ in. stand for 1 yd., how many yards will 1 in. stand for? 4 in.? 6 in.? Draw a barn 8 yd. by 12 yd., letting $\frac{1}{2}$ in. stand for 1 yd.

ROBERT'S GARDEN



Scale: $\frac{1}{4}$ inch = 1 foot

1. What does Robert grow in his garden?

2. In this drawing $\frac{1}{4}$ in. stands for 1 ft. How many feet does $\frac{1}{2}$ in. stand for? How many feet does 1 in. stand for? $1\frac{1}{2}$ in.?

3. Measure the width of the entire garden on the drawing. How many feet wide is the garden?

4. Measure the length of the garden on the drawing. How many feet do 3 in. stand for? $3\frac{1}{4}$ in.? Then how many feet long is the garden?

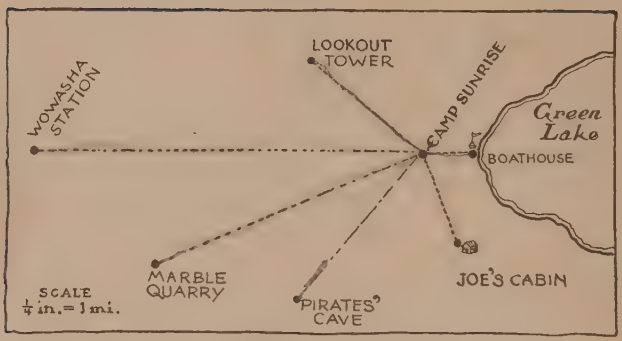
5. Find the area in square feet of the entire garden.

6. How long is Robert's pansy bed? How wide is it? How many square feet does it contain?

7. How many feet does $\frac{3}{4}$ in. stand for? $1\frac{1}{2}$ in.? How wide and how long is the bed of marigolds?

8. How wide and how long is the bean plot? the tomato plot? Find the area of each. The tomato plot is how many times as large as the bean plot?

CAMP SUNRISE



Eugene is going to Camp Sunrise next summer. Above is a map of the camp and the country around it. In the lower left-hand corner you read "$\frac{1}{4}$ in. = 1 mi." What does this mean?

1. On this map, how many miles does $\frac{1}{2}$ in. stand for? $\frac{3}{4}$ in.? 1 in.? 2 in.? 3 in.?

2. To find the distance from Camp Sunrise to the boathouse, measure with your ruler the dotted line between these points. This line is $\frac{1}{4}$ in. long. Since $\frac{1}{4}$ in. = 1 mi., it is 1 mi. from the camp to the lake.

3. Measure the line from Camp Sunrise to Lookout Tower. How far is it from the camp to the tower?

4. How far from the camp is the marble quarry?

5. How far is it from the camp to the Pirates' Cave? to Joe's Cabin?

6. How far is it from the camp to Wowasha Station?

PROBLEMS

Be sure that you understand each problem before you begin to work it. When you finish, read the problem over to see if you have found what was asked for.

1. Mary's marks in spelling last week were 95, 80, 95, 100, 90. What was her average mark last week?

2. Stanley had \$4.52. He spent \$1.76 for a watch. Now he wants to buy a bugle that costs \$2.95. How much more money does he need?

3. Mary bought $\frac{1}{2}$ doz. cookies at 30¢ a dozen and $1\frac{5}{8}$ lb. of nut cake at 48¢ a pound. How much did she spend for both?

4. Horace has $2\frac{1}{2}$ lb. of candy. He gives 1 lb. to his mother, $\frac{1}{2}$ lb. to his aunt, $\frac{1}{4}$ lb. to his brother, and $\frac{1}{4}$ lb. to his sister. How much candy has he left?

5. Our scout troop walked from 9.15 to 11.35 this morning. This afternoon we walked from 2.10 to 4.45. How many hours and minutes did we walk to-day?

6. The Scholars' Club collected \$25 from each of 413 people. This money was used to help 175 bright children go to high school. How much did each child receive?

7. The Brown School has a piece of land 42 ft. long and 40 ft. wide. If it divides this land into 35 school gardens each of the same size, how many square feet will each garden contain?

DRILL EXERCISES

Read the following numbers:

1. 4,804,621
2. 9,500,703
3. 19,002,400
4. 30,303,003
5. 651,270,021
6. 700,645,000

Add without copying. Practice until you can do and check the following 7 examples in 7 minutes:

7.	8.	9.	10.	11.	12.	13.
6	7	5	5	3	8	5
5	4	3	9	8	0	3
0	0	4	7	5	6	9
4	7	8	3	0	5	9
8	1	4	0	1	2	5
5	9	3	2	8	9	1
7	6	9	7	6	2	3
3	6	1	6	6	7	1
8	2	8	7	3	3	4
6	9	0	9	0	0	1
9	5	4	5	9	2	0
5	6	4	4	4	8	8
2	0	7	6	2	1	3
3	8	7	1	9	5	8

Practice until you can subtract and check the following 8 examples in 6 minutes (after copying):

14.	16.	18.	20.
\$969.00	\$8625.85	\$5262.20	\$8782.25
358.48	703.86	629.80	7695.95

15.	17.	19.	21.
\$816.50	\$8709.48	\$8250.89	\$8000.00
470.75	6154.69	3869.50	5571.62

DRILL EXERCISES

Add without copying. Practice until you can do and check 4 of the following examples in 8 minutes:

1.	3.	5.	7.
6593	4246	$66.03	$58.97
5067	2689	80.59	5.21
565	5760	7.21	63.25
6307	9742	91.76	38.50
7150	3108	46.90	7.83
8995	8295	49.63	70.08
3442	6910	94.01	77.38

2.	4.	6.	8.
4797	1154	$94.86	$71.77
2871	1755	56.80	83.93
9304	7922	20.04	44.49
880	2369	48.19	7.13
4318	7078	86.85	62.04
3621	8254	54.92	90.41
8569	9399	27.38	34.66

Practice until you can multiply and check 5 of the following examples in 8 minutes (after copying):

9.	11.	13.	15.	17.
467	932	607	853	769
453	786	680	901	290

10.	12.	14.	16.	18.
548	430	365	845	928
708	690	742	905	340

Divide. Check by multiplying:

19. $8305 \div 79$	**22.** $22{,}969 \div 34$	**25.** $70{,}628 \div 262$
20. $9551 \div 63$	**23.** $92{,}563 \div 451$	**26.** $166{,}116 \div 327$
21. $8460 \div 18$	**24.** $81{,}120 \div 390$	**27.** $514{,}775 \div 789$

DRILL EXERCISES

Add. Reduce fractions in answers to lowest terms:

1. $\frac{1}{2}$	2. $\frac{5}{8}$	3. $\frac{3}{4}$	4. $6\frac{1}{4}$	5. $2\frac{3}{4}$	6. $5\frac{3}{8}$
$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$6\frac{5}{8}$
7. $\frac{3}{4}$	8. $\frac{3}{4}$	9. $\frac{7}{8}$	10. $9\frac{1}{4}$	11. $8\frac{5}{8}$	12. $9\frac{3}{4}$
$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$3\frac{7}{8}$	$6\frac{1}{2}$	$4\frac{3}{8}$
13. $\frac{1}{8}$	14. $\frac{1}{2}$	15. $\frac{7}{8}$	16. $5\frac{1}{2}$	17. $6\frac{3}{4}$	18. $9\frac{3}{8}$
$\frac{3}{8}$	$\frac{3}{4}$	$\frac{1}{8}$	6	$5\frac{1}{4}$	$4\frac{1}{2}$
$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$	5

Subtract. Reduce fractions in answers to lowest terms. Check by going over the work again:

19. $8\frac{5}{8}$	21. $9\frac{1}{2}$	23. $16\frac{7}{8}$	25. $9\frac{1}{4}$	27. $7\frac{7}{8}$
$6\frac{3}{8}$	3	$11\frac{1}{8}$	$3\frac{1}{8}$	$2\frac{1}{4}$
20. $7\frac{3}{4}$	22. $9\frac{7}{8}$	24. $10\frac{5}{8}$	26. $8\frac{3}{4}$	28. $5\frac{1}{2}$
$2\frac{1}{4}$	$6\frac{5}{8}$	$\frac{1}{2}$	$4\frac{3}{8}$	$3\frac{1}{8}$

Find the following. Check by going over the work:

29. $\frac{1}{8}$ of 648	33. $\frac{3}{4}$ of \$4.64	37. $\frac{1}{2}$ of \$6.40
30. $\frac{1}{2}$ of 140	34. $\frac{7}{8}$ of \$7.20	38. $\frac{5}{8}$ of \$4.56
31. $\frac{2}{5}$ of 250	35. $\frac{2}{3}$ of \$3.63	39. $\frac{4}{5}$ of \$5.95
32. $\frac{3}{8}$ of 160	36. $\frac{3}{5}$ of \$2.75	40. $\frac{3}{8}$ of \$7.20

Multiply. Check by going over the work again:

41.	42.	43.	44.	45.
\$1.42	\$2.44	\$1.28	\$1.20	\$3.48
$5\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{5}{8}$	$4\frac{3}{4}$

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ANSWERS TO STRAYER–UPTON ARITHMETICS LOWER GRADES

Page 42. — **5.** 805; 506; 965; 918; 429; 236.

Page 43. — **3.** 12¢, $.12, $0.12; 6¢, $.06, $0.06. **4.** $4.65; $3.12; $1.31; $7.00. **5.** 7¢; $.07.

Page 45. — **1.** 20; 22; 21; 21; 23; 25; 20; 24. **2.** 22; 21; 23; 20; 22; 21; 25; 22.

Page 49. — **1.** 23; 24; 28; 30; 28; 29; 26; 20. **2.** 24; 26; 27; 20; 20; 25; 21; 27. **3.** 28; 19; 25; 25; 28; 21; 21; 27. **4.** 25; 20; 25; 17; 29; 24; 24; 24. **5.** 22; 23; 26; 28; 21; 26; 25; 30.

Page 50. — **1.** 18¢. **2.** 20¢. **3.** 20¢. **4.** 19¢. **5.** 19¢. **6.** 16¢.

Page 51. — **3.** 65 pages. **4.** 56¢.

Page 52. — **1.** 83. **2.** 105. **3.** 121. **4.** 82. **5.** 172. **6.** 95. **7.** 67. **8.** 121. **9.** 160. **10.** 131. **11.** 93. **12.** 96. **13.** 82. **14.** 133. **15.** 94. **16.** 81. **17.** 161. **18.** 170. **19.** 78. **20.** 184. **21.** 183 **22.** 74. **23.** 125. **24.** 93. **25.** 181. **26.** 142. **27.** 136. **28.** 91. **29.** 84. **30.** 157. **31.** 105. **32.** 92. **33.** 86. **34.** 92. **35.** 124. **36.** 141. **37.** 83. **38.** 96. **39.** 197. **40.** 90. **41.** 218. **42.** 98. **43.** 212. **44.** 182. **45.** 94. **46.** 92. **47.** 82. **48.** 159.

Page 53. — **1.** 93. **2.** 78. **3.** 60. **4.** 46. **5.** 83. **6.** 72. **7.** 53. **8.** 80. **9.** 92. **10.** 64.

Page 55. — **1.** 43¢. **2.** 74¢. **3.** 97¢. **4.** 88¢. **5.** 93¢. **6.** 75¢. **8.** 68. **9.** 51. **10.** 57. **11.** 40. **12.** 73. **13.** 67. **14.** 69. **15.** 92. **16.** 91. **17.** 86. **18.** 75. **19.** 98.

Page 56. — **1.** 65 persons. **2.** 92¢. **3.** 81¢. **4.** 61 children. **5.** 115 fares. **6.** 76 stamps. **7.** 91¢. **8.** 54 dishes. **9.** 86¢. **10.** $1.03. **11.** 79 flowers.

Page 57. — **1.** 591. **2.** 937. **3.** 696. **4.** 878. **5.** 582.

Page 58. — **1.** 293 roses. **2.** 593 books. **3.** 517 books. **4.** 378 days. **5.** 892. **6.** 777. **7.** 580. **8.** 971. **9.** 709. **10.** 774. **11.** 806. **12.** 909. **13.** 794. **14.** 906. **15.** 907. **16.** 670. **17.** 784. **18.** 480. **19.** 867. **20.** 984. **21.** 595. **22.** 908. **23.** 494. **24.** 623. **25.** 681. **26.** 672. **27.** 848. **28.** 996. **29.** 937.

Page 59. — **1.** 381 pages. **2.** 325 apples. **3.** 641. **4.** 981. **5.** 540. **6.** 654. **7.** 813. **8.** 336. **9.** 311. **10.** 616. **11.** 544. **12.** 953. **13.** 635. **14.** 643. **15.** 922. **16.** 648. **17.** 922. **18.** 910. **19.** 701. **20.** 877. **21.** 717. **22.** 931.

Page 60. — **1.** 840. **2.** 850. **3.** 960. **4.** 910. **5.** 617. **6.** 530. **7.** 440. **8.** 805. **9.** 700. **10.** 1059. **11.** 630. **12.** 504. **13.** 970. **14.** 714. **15.** 980. **16.** 440. **17.** 916. **18.** 1004. **19.** 700. **20.** 702. **21.** 200. **22.** 950. **23.** 1055. **24.** 830. **25.** 903. **26.** 836. **27.** 1000. **28.** 402. **29.** 602. **30.** 770. **31.** 550. **32.** 910. **33.** 610. **34.** 911. **35.** 883.

Page 61. — **1.** $8.31. **2.** $10.16. **3.** $7.35. **4.** $3.03. **5.** $13.05. **6.** $14.31. **7.** $9.51. **8.** $11.29. **9.** $8.67. **10.** $8.28. **11.** $12.96. **12.** $5.55. **13.** $19.83. **14.** $12.75. **15.** $18.50. **16.** $9.41.

Page 62. — **1.** $6.04. **2.** $5.16. **3.** $7.42. **4.** $7.50. **5.** $14.51. **6.** $7.97. **7.** $9.71. **8.** $3.03. **9.** $6.77.

Page 64. — **1.** 39¢. **2.** 17 miles. **3.** 23¢. **4.** 12 pounds.

Page 65. — **1.** 19. **2.** 26. **3.** 38. **4.** 17. **5.** 43. **6.** 42. **7.** 73. **8.** 36. **9.** 49. **10.** 43. **11.** 57. **12.** 49. **13.** 15. **14.** 25. **15.** 77. **16.** 46. **17.** 19. **18.** 68. **19.** 16. **20.** 46. **21.** 59. **22.** 19. **23.** 19. **24.** 41. **25.** 18. **26.** 35. **27.** 28. **28.** 24. **29.** 37. **30.** 36. **31.** 64. **32.** 24. **33.** 69. **34.** 48. **35.** 15. **36.** 39. **37.** 28. **38.** 19. **39.** 19. **40.** 18. **41.** 49. **42.** 35. **43.** 26. **44.** 52. **45.** 13. **46.** 37. **47.** 16. **48.** 27. **49.** 29. **50.** 59. **51.** 34. **52.** 37. **53.** 28. **54.** 28. **55.** 57. **56.** 56. **57.** 26. **58.** 49. **59.** 66. **60.** 7.

Page 66. — **3.** 92 boys. **4.** 93 days.

Page 67. — **1.** 538. **2.** 440. **3.** 749. **4.** 219. **5.** 268. **6.** 218. **7.** 648. **8.** 196. **9.** 452. **10.** 437. **11.** 744. **12.** 627. **13.** 539. **14.** 346. **15.** 286. **16.** 153. **17.** 435. **18.** 112. **19.** 117. **20.** 657. **21.** 472. **22.** 515. **23.** 549. **24.** 387. **25.** 264. **26.** 161. **27.** 139. **28.** 339. **29.** 377. **30.** 275. **31.** 471. **32.** 153. **33.** 254. **34.** 293. **35.** 282. **36.** 288. **37.** 528. **38.** 276. **39.** 116. **40.** 646.

Page 68. — **1.** 212 pounds; 315 pounds; 9 pounds; 195 pounds; 2 pounds; 76 pounds; 108 pounds; 283 pounds; 406 pounds; 12 pounds; 7 pounds; 3 pounds. **2.** Nancy and Wilbur. **3.** Jessie and Teddy. **4.** Lillian. **5.** Guessed too little: Jessie, Isabel, Howard, and Ralph; guessed too much: Philip, Kate, Nancy, Francis, Nellie, Lillian, Teddy, and Wilbur. **6.** Nellie.

Page 69. — **1.** 298. **2.** 246. **3.** 408. **4.** 389. **5.** 427. **6.** 259. **7.** 354. **8.** 157. **9.** 169. **10.** 269. **11.** 538. **12.** 594. **13.** 569. **14.** 439. **15.** 868. **16.** 89. **17.** 675. **18.** 383. **19.** 474. **20.** 278.

Page 70. — 1. 607. 2. 164. 3. 184. 4. 639. 5. 428. 6. 206. 7. 420. 8. 557. 9. 474. 10. 101. 11. 209. 12. 834. 13. 89. 14. 703. 15. 43. 16. 309. 17. 320. 18. 175. 19. 63. 20. 594. 21. 207. 22. 675. 23. 288. 24. 108. 25. 149.

Page 71. — 2. $2.17. 3. $2.61. 4. $.84. 5. $1.14. 6. $2.47.

Page 78. — 1. 12¢. 2. 5 pencils. 3. 9 children. 4. 20¢. 5. 6¢. 6. 8 days. 7. 14¢. 8. $12; $16. 9. 8; 16; 4. 10. 18; 6; 1. 11. 4; 0; 7.

Page 79. — 1. 64. 2. 42. 3. 108. 4. 184. 5. 66. 6. 80. 7. 126. 8. 162. 9. 86. 10. 144. 11. 168. 12. 182. 13. 40. 14. 188. 15. 100. 16. 84. 17. 682. 18. 248. 19. 866. 20. 460.

Page 80. — 1. 42¢. 2. 84¢. 3. $66. 4. 24 eggs. 5. $1.44.

Page 81. — 1. 54. 2. 158. 3. 136. 4. 50. 5. 36. 6. 76. 7. 92. 8. 130. 9. 98. 10. 154. 11. 94. 12. 34. 13. 118. 14. 58. 15. 170. 16. 178. 17. 52. 18. 114. 19. 174. 20. 112. 21. 74. 22. 190. 23. 192. 24. 156. 25. 270. 26. 878. 27. 838. 28. 830. 29. 832. 30. 638. 31. 474. 32. 452. 33. 476. 34. 692. 35. 256. 36. 294.

Page 82. — 1. $1.34; 100¢; $1.00. 2. 96¢; 52¢; $3.82.

1. 280. 2. 410. 3. 800. 4. 214. 5. 606. 6. 616. 7. 808. 8. 614. 9. 400. 10. 412.

Page 83. — 1. 112 miles. 2. 70¢. 3. 90¢. 4. 34 strokes. 5. 32 shells. 7. 38 feet.

Page 89. — 1. $1.59. 2. 72 children. 3. 69. 4. 57. 5. 48. 6. 108. 7. 135. 8. 294. 9. 123. 10. 234. 11. 216. 12. 51. 13. 186. 14. 132. 15. 165. 16. 255. 17. 87. 18. 180. 19. 111. 20. 201.

Page 90. — 1. 417 papers. 2. 501 papers. 3. 918 papers. 4. 825 feet. 5. 552 da.

Page 91. — 1. 747. 2. 564. 3. 444. 4. 573. 5. 927. 6. 470. 7. 496. 8. 585. 9. 888. 10. 771. 11. 849. 12. 624. 13. 292. 14. 408. 15. 708. 16. 522. 17. 804. 18. 426. 19. 912. 20. 405. 21. 618. 22. 531. 23. 765. 24. 717. 25. 789. 26. 321. 27. 558. 28. 738. 29. 774. 30. 417. 31. 495. 32. 756. 33. 618. 34. 314. 35. 501. 36. 411 vacation days. 37. 735 miles. 38. $555.

Page 94. — 3. 21 ft. 4. 2 yd. 5. 4 yd.; 6 yd.; 7 yd.; 9 yd. 6. 12 in.; 24 in.; 60 in.; 48 in.; 72 in. 7. 6 in.; 4 in.; 1 ft.; 6 yd.; 8 yd. 8. 16 in.

Page 95. — 1. 43¢. 2. 21 marbles. 3. 12 yd. 4. 41. 5. 12. 6. 13. 7. 32. 8. 42. 9. 11. 10. 24. 11. 31. 12. 14. 13. 13. 14. 32. 15. 22. 16. 44. 17. 33. 18. 23. 19. 11; 31; 22; 33.

Page 97. — 1. 17 miles. 2. 28 marbles. 3. 29 yd. 4. 36.
5. 17. 6. 14. 7. 25. 8. 19. 9. 16. 10. 39. 11. 18.
12. 38. 13. 25. 14. 46. 15. 28. 16. 18. 17. 37.
18. 24. 19. 15. 20. 49. 21. 27. 22. 45. 23. 15.
24. 16. 25. 20. 26. 19. 27. 27. 28. 48.

Page 98. — 3. 59 stamps. 4. 71. 5. 72. 6. 65. 7. 85.
8. 39. 9. 84. 10. 84. 11. 68. 12. 97. 13. 78. 14. 66.
15. 89. 16. 64. 17. 52. 18. 94. 19. 63. 20. 95.
21. 74.

Page 104. — 2. 336 chairs. 3. 660 miles. 4. $940. 5. 52.
6. 116. 7. 296. 8. 184. 9. 92. 10. 208. 11. 256.
12. 348. 13. 64. 14. 284. 15. 272. 16. 380. 17. 456.
18. 728. 19. 988. 20. 424. 21. 712. 22. 764. 23. 756.
24. 632. 25. 460. 26. 648. 27. 784. 28. 936.

Page 105. — 3. 203. 4. 90. 5. 301. 6. 202. 7. 280.
8. 300. 9. 50. 10. 202. 11. 90. 12. 102. 13. 110.
14. 380.

Page 106. — 1. 16. 2. 19. 3. 23. 4. 27. 5. 15. 6. 13.
7. 171. 8. 142. 9. 114. 10. 203. 11. 89. 12. 309.
13. 102. 14. 180. 15. 220. 16. 405. 17. 459. 18. 250.
19. 4521. 20. 1020. 21. 2001. 22. 2100. 23. 3000.
24. 2051.

Page 108. — 1. 29 blue hats. 2. $48. 3. 36. 4. 47. 5. 66.
6. 77. 7. 25. 8. 53. 9. 65. 10. 97. 11. 26. 12. 211.
13. 78. 14. 88. 15. 45. 16. 75. 17. 201. 18. 109.
19. 34. 20. 89. 21. 74. 22. 49. 23. 33. 24. 39.
25. 54. 26. 120. 27. 63. 28. 44; 52; 72; 160; 84.

Page 109. — 1. 624 quart bottles. 2. 272 pint bottles. 3. 67 gal.
4. 98 qt. 5. 136 pt.; 68 qt.; 17 gal. 6. 19 gal.

Page 113. — 1. 95¢. 2. $6.90. 3. $2.35. 4. $2.80.
5. $1.40. 6. $3.20. 7. $1.65. 8. $4.85. 9. $1.05.
10. $3.90. 11. 705. 12. 1090. 13. 835. 14. 730. 15. 1490.
16. 735. 17. 525. 18. 1080. 19. 655. 20. 970. 21. 1425.
22. 630. 23. 530. 24. 820. 25. 585. 26. 770. 27. 675.
28. 895. 29. 875. 30. 545. 31. 685. 32. 955. 33. 1290.
34. 1185. 35. 815. 36. 1190. 37. 540. 38. 750.

Page 115. — 1. 11 yd. 2. 47 rows. 3. 15 nickels. 4. 18 days.
5. 13 tickets. 6. 69 bunches. 7. 6 chairs, $3.00 left. 8. 17.
9. 12. 10. 16. 11. 19. 12. 14. 13. 95. 14. 87. 15. 75.
16. 84. 17. 60. 18. 79. 19. 77. 20. 29. 21. 64.
22. 41. 23. 25. 24. 73. 25. 71. 26. 52. 27. 21.
28. 39. 29. 45. 30. 30. 31. 33. 32. 51. 33. 65; 75; 50;
55; 85.

Page 116. — 12. 23. 13. 27. 14. 26. 15. 21. 16. 21.
17. 23. 18. 25. 19. 701. 20. 822. 21. 544. 22. 813.
23. 905. 24. 419. 25. 73. 26. 225. 27. 369. 28. 189.
29. $.07. 30. $2.07. 31. $1.49. 32. $1.68. 33. $1.56.

Page 117. — **1.** 372; 416; 1268; 696, 615; 1580. **2.** 940; 789; 710; 1060; 785; 507. **3.** 27; 24; 14; 63; 57; 59. **4.** 19; 19; 23; 201; 122; 302. **5.** 15; 27; 45; 25; 84; 80. **6.** 16; 18; 16; 75; 101; 203. **7.** 3080 chickens. **8.** 1752 eggs. **9.** $29.45. **10.** $46.52.

Page 118. — **1.** 42 ft. **2.** 24¢. **3.** $10.57. **4.** 72 qt. **5.** 83¢. **6.** 135 stamps. **7.** $3.30. **8.** 38; 21; 17; 19. **9.** 32; 20; 46; 69. **10.** 48; 25; 13; 12.

Page 120. — **7.** 4000. **8.** 1400. **9.** 1005. **10.** 7015. **11.** 8018. **12.** 1247. **13.** 3562.

Page 121. — **4.** 11; 18; 14; 17. **5.** XV; XVI. **6.** 19 chapters. **7.** XI; XIV; XVI; XVII; XVIII. **9.** 22; 26; 27; 30. **10.** XXI; XXIII; XXVI; XXIX; XXX.

Page 123. — **1.** 34. **2.** 30. **3.** 42. **4.** 38. **5.** 42. **6.** 31. **7.** 46. **8.** 31. **9.** 36. **10.** 44. **11.** 25. **12.** 37. **13.** 33. **14.** 37.

Page 124. — **1.** 30. **2.** 33. **3.** 25. **4.** 24. **5.** 27. **6.** 30. **7.** 30. **8.** 21. **9.** 34. **10.** 42. **11.** 32. **12.** 31. **13.** 37. **14.** 30. **15.** 32. **16.** 30. **17.** 297. **18.** 264. **19.** 250. **20.** 307. **21.** 260. **22.** 291. **23.** 261. **24.** 359. **25.** 409. **26.** 397. **27.** 258. **28.** 368.

Page 125. — **1.** $19.75. **2.** $27.11. **3.** $3.73. **4.** $35.80. **5.** 75. **6.** 88. **7.** 81. **8.** 85. **9.** 99. **10.** 95. **11.** 74. **12.** 96.

Page 126. — **1.** Right. **2.** Wrong; 1848 correct answer. **3.** Right. **4.** Wrong; 1652 correct answer. **5.** Right. **6.** Right. **7.** Right. **8.** Wrong; $20.99 correct answer. **9.** Right. **10.** Right. **11.** Wrong; $166.10 correct answer. **12.** Right. **13.** Right. **14.** Right. **15.** Right. **16.** Right. **17.** Wrong; $100.18 correct answer. **18.** Right.

Page 127. — **3.** $50.83. **4.** $15.13. **5.** $48.86. **6.** $13.38. **7.** $41.63. **8.** $43.87. **9.** $43.35. **10.** $40.66.

Page 128. — **1.** $1.90. **2.** 3669. **3.** 4499. **4.** 8878. **5.** 6343. **6.** 7687. **7.** 1985. **8.** 3683. **9.** 1224. **10.** 8478. **11.** 2636. **12.** 9610. **13.** 2097. **14.** $46.07. **15.** $40.98. **16.** $49.68. **17.** $53.45. **18.** $28.80. **19.** $39.30. **20.** $23.10. **21.** $25.78. **22.** $49.60. **23.** $75.93. **24.** $50.88. **25.** $17.76. **26.** $87.86. **27.** $60.88. **28.** $39.54. **29.** $22.52.

Page 129. — **1.** 143 miles; 183 miles; 205 miles. **2.** 41 miles. **3.** 48 miles. **4.** 88 miles; 40 miles; 89 miles. **5.** 62 miles. **6.** $62.17.

Page 130. — **5.** 2 cents, 1 nickel, 1 quarter; 2 cents, 1 quarter; 3 cents, 1 dime, 1 nickel; 3 cents, 1 dime, 1 nickel, 1 quarter; 7 cents, 1 dime, 1 nickel, 1 quarter; 2 cents, 1 dime, 1 quarter; 2 cents, 2 dimes. **6.** 3 cents, 1 quarter, 1 half dollar; 1 dime, 1 quarter, 1 half dollar;

3 cents, 1 dime, 1 half dollar; 1 nickel, 1 dime; 2 cents, 1 dime, 1 nickel, 1 quarter, 1 half dollar; 3 cents, 1 dime, 1 quarter; 4 cents, 1 nickel, 1 half dollar; 3 cents, 1 dime, 1 quarter, 1 half dollar; 3 cents, 2 dimes, 1 half dollar; 2 cents, 1 quarter; 1 cent, 1 nickel; 1 cent, 2 dimes, 1 quarter, 1 half dollar; 3 cents, 1 nickel, 1 quarter, 1 half dollar; 4 cents, 1 nickel, 1 dime, 1 half dollar.

Page 131. — **1.** 28, 30, 35, 40, 50, 75, $1; yes; use an extra dime instead of 2 nickels, and a half dollar instead of 2 quarters. **2.** 61¢; 1 cent, 1 dime, and 1 half dollar or 1 cent, 1 dime, and 2 quarters. **3.** Yes; $1.65, $1.75, $2, $3, $4, $5. **4.** 2 cents, 1 nickel, 1 quarter, 1 half dollar, 1 dollar; $3.18, $3.20, $3.25, $3.50, $4.00, $5.00. **5.** (*a*) 4 cents, 1 dime, 1 half dollar, 1 dollar; (*b*) 2 cents, 1 nickel, 1 dime, 1 half dollar, 1 dollar; (*c*) 2 cents, 1 half dollar, 1 dollar. **6.** 2 cents, 1 quarter, 2 dollars. **7.** 2 dimes. **8.** 10 nickels.

Page 135. — **1.** 126. **2.** 102. **3.** 90. **4.** 78. **5.** 305.
6. 455. **7.** 520. **8.** 512. **9.** 100. **10.** 225. **11.** 306.
12. 228. **13.** 510. **14.** 546. **15.** 248. **16.** 488. **17.** 192.
18. 108. **19.** 165. **20.** 92. **21.** 84. **22.** 570. **23.** 156.
24. 288. **25.** 268. **26.** 234. **27.** 324. **28.** 260. **29.** 432.
30. 174. **31.** 372. **32.** 540. **33.** 402. **34.** 294. **35.** 78.
36. 434. **37.** 427. **38.** 252. **39.** 176. **40.** 176. **41.** 390.
42. 162. **43.** 234. **44.** 420. **45.** 430. **46.** 204. **47.** 120.
48. 496. **49.** 165. **50.** 96. **51.** 204. **52.** 486. **53.** 270.
54. 408.

Page 136. — **1.** $25.08. **2.** $4.50. **3.** $2.76. **4.** $37.00.
5. $4.75. **6.** $38.58. **7.** $2.52. **8.** $42.48. **9.** $4.68.
10. $25.50. **11.** $3.42. **12.** $23.75.

Page 137. — **1.** $8.60. **2.** $3.42. **3.** $6.72; $10.08. **4.** $7.05.
1. $43.14. **2.** $15.00. **3.** $5.10. **4.** $57.24. **5.** $22.50.
6. $29.16. **7.** $5.76. **8.** $18.12. **9.** $51.72. **10.** $30.42.
11. $2.04. **12.** $40.50. **13.** $8.94. **14.** $11.64. **15.** $1.62.
16. $48.54. **17.** $51.78. **18.** $19.62. **19.** $4.08. **20.** $26.22.
21. Multiplying by 5: $35.95; $12.50; $4.25; $47.70; $18.75; $24.30; $4.80; $15.10; $43.10; $25.35. Multiplying by 4: $28.76; $10.00; $3.40; $38.16; $15.00; $19.44; $3.84; $12.08; $34.48; $20.28.

Page 139. — **1.** $48. **2.** $102. **3.** $130.

Page 140. — **1.** 6 eggs. **2.** 123 boxes. **3.** $234. **4.** 8 yd.; 2¢ left. **5.** 5 rows; 3 pupils. **6.** 11. **7.** 13. **8.** 16. **9.** 14.
10. 15. **11.** 31. **12.** 40. **13.** 50. **14.** 64. **15.** 17.
16. 67. **17.** 85. **18.** 70. **19.** 84. **20.** 118. **21.** 162.
22. 149. **23.** 78. **24.** 134. **25.** 136. **26.** 103. **27.** 2041.
28. 1061. **29.** 208. **30.** 1090. **31.** 1025. **32.** 406. **33.** 1090.

Page 142. — **1.** 11.08. **2.** 12.28; 1.53.

1. Singing, 15 min.; arithmetic, 25 min.; spelling, 10 min.; free, 5 min.; history, 30 min.; writing, 20 min.; recess, 15 min.; reading, 25 min.; art, 35 min.; lunch, 1 hr.; study period, 25 min.; composition 30 min.; gymnasium, 25 min.; nature study, 25 min.

Page 146. — **1.** 217. **2.** 112. **3.** 189. **4.** 399. **5.** 420. **6.** 568. **7.** 630. **8.** 370. **9.** 413. **10.** 567. **11.** 329. **12.** 623. **13.** 490. **14.** 355. **15.** 333. **16.** 296. **17.** 603. **18.** 224. **19.** 91. **20.** 203. **21.** 504. **22.** 119. **23.** 304. **24.** 600. **25.** 308. **26.** 456. **27.** 364. **28.** 371. **29.** 420. **30.** 98. **31.** 511. **32.** 291. **33.** 630. **34.** 675. **35.** 234. **36.** 188. **37.** 644. **38.** 518. **39.** 350. **40.** 532. **41.** 426. **42.** 153. **43.** 210. **44.** 243. **45.** 335. **46.** 406. **47.** 637. **48.** 392. **49.** 469. **50.** 395. **51.** 474. **52.** 536. **53.** 280. **54.** 693.

Page 147. — **1.** 1092 times. **2.** 1596 times. **3.** 7812 times. **4.** 2100 times; 3108 times. **5.** 6510. **6.** 5488. **7.** 4711. **8.** 1092. **9.** 1016. **10.** 1526. **11.** 4424. **12.** 5978. **13.** 2149. **14.** 3685. **15.** 4438. **16.** 5509. **17.** 756. **18.** 5607. **19.** 680. **20.** $20.65. **21.** $31.64. **22.** $17.08. **23.** $63.14. **24.** $21.00. **25.** $54.67. **26.** $27.30. **27.** $42.35. **28.** $39.83. **29.** $9.63. **30.** 2790; 2352; 2019; 468. **31.** $17.70; $27.12; $14.64; $54.12.

Page 149. — **2.** $2.85. **3.** $1.24. **4.** $1.71. **5.** $.59. **6.** $40. **7.** $52. **8.** $124. **9.** $135. **10.** $98. **11.** $103. **12.** $.37. **13.** $1.29. **14.** $1.06. **15.** $1.99. **16.** $1.03. **17.** $.49. **18.** $15.00. **19.** $16.50. **20.** $13.84. **21.** $8.81. **22.** $5.01. **23.** $2.93. **24.** $30.92. **25.** $72.10. **26.** $56.07. **27.** $15.84. **28.** $44.23. **29.** $52.01.

Page 150. — **1.** 258 *R* 1. **2.** 217 *R* 1. **3.** 102 *R* 3. **4.** 81 *R* 3. **5.** 43 *R* 5. **6.** 250 *R* 1. **7.** 78 *R* 2. **8.** 239 *R* 2. **9.** 74 *R* 2. **10.** 83 *R* 4. **11.** 89 *R* 3. **12.** 132 *R* 5. **13.** 61 *R* 1. **14.** 103 *R* 1. **15.** 140 *R* 2. **16.** 54 *R* 3. **17.** 69 *R* 1. **18.** 42 *R* 5. **19.** $.86 *R* 2¢. **20.** $.38 *R* 2¢. **21.** $1.21 *R* 5¢. **22.** $2.31 *R* 2¢. **23.** $1.27 *R* 6¢. **24.** $.94 *R* 2¢.

Page 151. — **1.** $2.10; $1.40. **2.** $1.20. **3.** $31.50; $6.30. **4.** 3 boys; 3 boys. **5.** 64. **6.** 128. **7.** 46 *R* 6. **8.** 87 *R* 2. **9.** 131 *R* 5. **10.** 58. **11.** 63 *R* 1. **12.** 79 *R* 2. **13.** 85 *R* 5. **14.** 99. **15.** 348. **16.** 645. **17.** 942. **18.** 307 *R* 1. **19.** 461 *R* 2. **20.** $1.17. **21.** $1.32. **22.** $.54. **23.** $.69. **24.** $1.08. **25.** $1.34. **26.** $1.03. **27.** $.72. **28.** $1.23 *R* 3¢. **29.** $.73 *R* 3¢.

Page 152. — **7.** 42. **8.** 56. **9.** 28. **10.** 1; 2. **11.** 4; 2. **12.** 6; 3.

Page 153. — **1.** Nov. 1; Nov. 8; Nov. 15. **2.** Count by 7's beginning with the date of the first Sunday. **3.** Dec. 10; Dec. 17; Dec. 24. **5.** Dec. 30. **6.** 5 wk. **7.** 15 da. **8.** (*a*) 12 da.; (*b*) 24 da.

Page 155. — **1.** 299. **2.** 304. **3.** 283. **4.** 280. **5.** 327. **6.** 273. **7.** 260. **8.** 279. **9.** 340. **10.** 296. **11.** 448. **12.** 404. **13.** $57.77. **14.** $49.67. **15.** $37.09. **16.** $80.29. **17.** $68.78. **18.** $30.24. **19.** $65.99. **20.** $57.30. **21.** $70.89. **22.** $55.90. **23.** $56.26. **24.** $43.09. **25.** $18.09. **26.** $66.89. **27.** $4.50. **28.** $63.66.

Page 158. — **1.** 168. **2.** 104. **3.** 120. **4.** 112. **5.** 486. **6.** 440. **7.** 352. **8.** 340. **9.** 568. **10.** 552. **11.** 288. **12.** 736. **13.** 510. **14.** 168. **15.** 581. **16.** 140. **17.** 96. **18.** 360. **19.** 752. **20.** 296. **21.** 406. **22.** 609. **23.** 320. **24.** 348. **25.** 424. **26.** 720. **27.** 304. **28.** 464. **29.** 430. **30.** 204. **31.** 602. **32.** 516. **33.** 600. **34.** 512. **35.** 496. **36.** 480. **37.** 72. **38.** 340. **39.** 476. **40.** 261. **41.** 704. **42.** 216. **43.** 624. **44.** 392. **45.** 84. **46.** 336. **47.** 656. **48.** 249.

Page 159. — **10.** 9 oranges; 3¢ change. **11.** 7 packages; 4 pieces left.

Page 160. — **1.** \$5.36. **2.** \$1.13. **3.** \$2.15. **4.** 1248. **5.** 2056. **6.** 2456. **7.** 6992. **8.** 3728. **9.** 4840. **10.** 3136. **11.** 7344. **12.** 3856. **13.** \$30.24. **14.** \$40.96. **15.** \$40.24. **16.** \$32.72. **17.** \$64.72. **18.** \$53.92. **19.** 101. **20.** 102. **21.** 103. **22.** 105. **23.** 104. **24.** 107. **25.** 109. **26.** 108. **27.** 120. **28.** 15. **29.** 17. **30.** 21 *R* 2. **31.** 25. **32.** 86 *R* 7. **33.** \$2.01. **34.** \$9.49. **35.** \$10.88 *R* 6¢. **36.** \$2.06. **37.** \$4.56 *R* 2¢. **38.** \$8.17 *R* 3¢. **39.** \$5.24. **40.** \$1.31. **41.** \$1.40. **42.** \$3.31. **43.** \$4.20 *R* 5¢. **44.** \$5.00 *R* 3¢. **45.** \$1.25. **46.** \$9.21 *R* 7¢.

Page 161. — **1.** 8 qt.; $\frac{1}{4}$ bu. **2.** 64 qt. **3.** \$3.20. **4.** 104 baskets. **5.** 2 pk.; 3 pk. **6.** \$2.04.

Page 162. — **4.** 8 oz.; 4 oz.; 2 oz.; 32 oz.; 48 oz. **5.** Too much. **6.** 1¢. **7.** 24 4-ounce cans; 12 8-ounce cans.

Page 165. — **1.** 369. **2.** 378. **3.** 144. **4.** 108. **5.** 728. **6.** 760. **7.** 465. **8.** 792. **9.** 549. **10.** 522. **11.** 837. **12.** 459. **13.** 174. **14.** 576. **15.** 640. **16.** 483. **17.** 288. **18.** 810. **19.** 666. **20.** 675. **21.** 470. **22.** 388. **23.** 570. **24.** 98. **25.** 513. **26.** 504. **27.** 405. **28.** 351. **29.** 360. **30.** 152. **31.** 76. **32.** 475. **33.** 252. **34.** 333. **35.** 261. **36.** 360. **37.** 207. **38.** 632. **39.** 291. **40.** 236. **41.** 801. **42.** 639. **43.** 747. **44.** 207. **45.** 658. **46.** 639. **47.** 294. **48.** 720.

Page 166. — **12.** 2 boys; 7 boys.

Page 167. — **1.** \$18.50. **2.** \$112.50. **3.** \$55. **4.** 101. **5.** 13. **6.** 24. **7.** 35. **8.** 57 *R* 2. **9.** 45 *R* 3. **10.** 103 *R* 4. **11.** 53. **12.** 59. **13.** 29 *R* 5. **14.** 39 *R* 3. **15.** 22. **16.** 30. **17.** 109. **18.** 50 *R* 1. **19.** 84 *R* 6. **20.** 94. **21.** 63. **22.** \$5.38 *R* 8¢. **23.** \$3.20. **24.** \$9.08. **25.** \$2.13. **26.** \$6.01. **27.** \$6.72 *R* 2¢. **28.** 1035. **29.** 2151. **30.** 4221. **31.** 6489. **32.** 4140. **33.** 3222. **34.** 4698. **35.** 1647. **36.** 2394. **37.** \$11.25. **38.** \$25.47. **39.** \$33.03. **40.** \$21.33. **41.** \$54.63. **42.** \$53.10.

Page 168. — **1.** 36 rows. **2.** 18 rows. **3.** 48 rows; no. **4.** 72 rows; no. **5.** Yes. **6.** 28 rows, 4 children left; 20 rows, 4 children left. **7.** \$3.24.

Page 169. — **1.** 1035. **3.** 1953; 1062; 2205; 2403; 1422; 2070. **4.** 1410. **6.** 1434; 942; 2094; 1008; 2706; 1662.

S. U. AR. — L. G.

Page 170. — **1.** 8658. **2.** 4626. **3.** 5877. **4.** 7623. **5.** 2763. **6.** 8127. **7.** 4518. **8.** 8847. **9.** 1602. **10.** 1224. **11.** 2961. **12.** 2565. **13.** 4248. **14.** 3654. **15.** 6345. **16.** Multiply 173 by 2; then multiply the result by 2. It works because $2 \times 2 = 4$. **17.** 516; 1432; 424; 1384; 1308; 1756. **18.** Multiply by 4 and then multiply the result by 2; or multiply by 2 three times. **20.** 103. **21.** 32. **22.** 106. **23.** 39. **24.** 87. **25.** 82. **26.** 201. **27.** 394. **28.** 339. **29.** 113.

Page 172. — **1.** $16.56. **2.** 231 rooms. **3.** 336 miles. **4.** 270 gal. **5.** 9 groups, 3 pupils left out. **6.** $30. **7.** $6.75. **8.** 32 gal. **9.** $6.50.

Page 173. — **1.** $3.55. **2.** $8.87. **3.** $20.76. **4.** 1 cent, 2 dimes, 1 quarter, 1 half dollar; 3 cents, 1 nickel, 1 quarter, 1 half dollar; 3 cents, 1 quarter, 1 half dollar; 1 nickel, 1 dime, 1 half dollar; 1 cent, 1 nickel, 1 quarter; 2 cents, 2 dimes. **5.** 2 cents, 1 nickel, 1 dime, 1 quarter, 1 half dollar; 2 cents, 2 dimes, 1 half dollar; 4 cents, 1 nickel, 1 half dollar; 2 cents, 1 nickel, 1 dime; 4 cents, 1 nickel; 1 cent, 1 half dollar. **6.** 2 cents, 1 quarter, 4 dollars; 1 dime, 1 quarter, 1 half dollar, 3 dollars; 3 cents, 1 dime, 3 dollars; 1 quarter, 1 half dollar, 2 dollars; 2 cents, 1 nickel, 1 quarter, 1 half dollar. **7.** 1 cent, 1 quarter, 1 half dollar, 4 dollars; 1 nickel, 2 dollars; 1 cent, 1 dollar; 2 cents, 1 dime, 1 half dollar; 4 cents, 2 dimes, 1 quarter, 1 half dollar, 2 dollars. **8.** $22.77. **9.** $28.00. **10.** $23.63. **11.** $29.54. **12.** $21.42. **13.** $24.37. **14.** $20.30. **15.** $15.52.

Page 174. — **4.** $35.62. **5.** $35.79. **6.** $37.71. **7.** $30.19. **8.** $42.55. **9.** $78.93. **10.** $14.39. **11.** $17.82. **12.** $57.47. **13.** $29.02. **14.** $45.88. **15.** $33.81. **16.** 1030. **17.** 1350. **18.** 910. **19.** 4854. **20.** 1188. **21.** 6489. **22.** 3102. **23.** 1300. **24.** 1554. **25.** 4375. **26.** 350. **27.** 54. **28.** 95. **29.** 82. **30.** 209 *R* 3. **31.** 50. **32.** 226. **33.** 92. **34.** 41. **35.** 242 *R* 4. **36.** 180. **37.** 404.

Page 176. — **8.** 67,408; 508,109; 289,007; 607,501. **9.** 9999; 99,999; 999,999; 1000; 10,000; 100,000.

Page 178. — **1.** 25. **2.** 34. **3.** 32. **4.** 25. **5.** 33. **6.** 38. **7.** 30. **8.** 23. **9.** 31. **10.** 28. **11.** 30. **12.** 33. **13.** 22. **14.** 19. **15.** $1174.46. **16.** $1308.31. **17.** $1639.56. **18.** $824.61. **19.** 3452. **20.** 2719. **21.** 3408. **22.** 2220. **23.** 3313.

Page 179. — **1.** 442. **2.** 388. **3.** 352. **4.** 371. **5.** 349. **6.** 398. **7.** 460. **8.** 401. **9.** 324. **10.** 581. **11.** 491. **12.** 438. **13.** 49. **14.** 51. **15.** 40. **16.** 49. **17.** 49. **18.** 55. **19.** 46. **20.** 42.

Page 181. — **1.** Abner, 5 lb.; Billy, 4 lb.; Dan, 7 lb.; Edgar, 7 lb.; Fred, 4 lb.; Jerry, 7 lb.; Jesse, 9 lb.; Mark, 0 lb.; Nat, 3 lb.; Peter, 6 lb.; Ralph, 7 lb.; Rollo, 4 lb.; Anna, 7 lb.; Betty, 9 lb.; Clara, 8 lb.; Doris, 4 lb.; Grace, 5 lb.; Helen, 6 lb.; Ida, 9 lb.; Julia, 6 lb.; Maud, 3 lb.; Nora, 5 lb.; Polly, 2 lb.; Susan, 8 lb. **2.** Abner, Billy, Dan, Edgar, Nat, Ralph, Anna, Doris, Grace, Helen, Ida, Julia, Maud, and Nora. **3.** Fred, Jerry, Jesse, Peter, Rollo, Betty, Clara, Polly, and Susan. **4.** Mark.

Page 182. — **1.** $24.40. **2.** $28.52. **3.** $26.44. **4.** $20.98. **5.** $30.24; $15.12.

Page 183. — **2.** 2 cents, 1 nickel, 1 dime; 2 cents, 2 dimes; 3 cents, 1 nickel, 1 quarter; 4 cents, 1 dime; 1 dime, 1 quarter; 2 cents, 1 dime; 4 cents; 4 cents, 1 nickel, 1 dime. **3.** 1 cent, 1 nickel, 1 quarter; 4 cents, 1 dime, 1 quarter; 2 cents; 3 cents, 2 dimes; 1 nickel; 1 cent, 1 dime; 1 quarter; 1 cent, 1 nickel. **4.** 357. **5.** 379. **6.** 196. **7.** 388. **8.** 124. **9.** 277. **10.** 140. **11.** 396. **12.** 199. **13.** 454. **14.** 528. **15.** 499. **16.** 208. **17.** 153. **18.** 507. **19.** 1258. **20.** 5699. **21.** 2623. **22.** 6857. **23.** 3760. **24.** 6966. **25.** 2087. **26.** 1856. **27.** 2075. **28.** 3438. **29.** 1706. **30.** 4374.

Page 184. — **1.** Yes. **2.** $60.75. **3.** $125.50.

Page 185. — **1.** 18,179. **2.** 34,942. **3.** 28,795. **4.** 23,309. **5.** 52,774. **6.** 26,838. **7.** 45,374. **8.** 46,590. **9.** 40,956. **10.** 33,599. **11.** 39,718. **12.** 50,699. **13.** 16,785. **14.** 39,550. **15.** 14,728. **16.** 19,002. **17.** $47.76. **18.** $363.67. **19.** $177.49. **20.** $485.93. **21.** $560.43. **22.** $149.68. **23.** $355.39. **24.** $279.10. **25.** $187.20. **26.** $196.68. **27.** $254.58. **28.** $143.87. **29.** $749.95. **30.** $504.56. **31.** $218.59. **32.** $837.86. **33.** $23.74.

Page 187. — **1.** 70; 140; 280; 500; 1200; 4590; 17,320. **2.** 90; 330; 900; 690; 3830; 6700; 14,500. **3.** 4900; 7000; 68,500; 43,000; 94,800; 149,800; 56,400. **4.** 49,000; 70,000; 685,000; 430,000; 948,000; 1,498,000; 564,000. **5.** 90¢. **6.** $1.70. **7.** $3.00. **8.** $200. **9.** $20. **10.** $15. **11.** 100¢; 50¢; 250¢; 500¢; 1000¢; 2500¢.

Page 188. — **1.** 540. **2.** 1890. **3.** 81,500. **4.** 55,000. **5.** 142,400. **6.** 253,200. **7.** 78,000. **8.** 364,000. **9.** 1350. **10.** 3480. **11.** 254,000. **12.** 93,000. **13.** 1,467,000. **14.** 2,000,000. **15.** $1288.

Page 189. — **1.** 6; 17; 23; 58; 145; 390. **2.** 4; 28; 18; 20; 160; 200. **3.** 5; 7; 16; 45; 27; 48. **4.** 3; 9; 23; 50; 70; 90. **5.** 50; 70; 160; 450; 270; 480; 30; 90; 230; 500; 700; 900. **6.** $9. **7.** $4. **8.** 8 dimes; 6 dimes; 25 dimes; 20 dimes. **9.** 5 dollars.

Page 192. — **1.** 276 miles. **2.** 903 flowers. **3.** 2016 stamps. **4.** 714. **5.** 1888. **6.** 736. **7.** 1961. **8.** 882. **9.** 6256. **10.** 429. **11.** 3915. **12.** 946. **13.** 1298. **14.** 1426. **15.** 2448.

Page 193. — **1.** 240 glasses. **2.** 2625 gal. **3.** 1430 apples. **4.** 4316. **5.** 4116. **6.** 3185. **7.** 2394. **8.** 2044. **9.** 2184. **10.** 3876. **11.** 4352. **12.** 2784. **13.** 3525. **14.** 3081. **15.** 2322. **16.** 4416. **17.** 2538. **18.** 3612. **19.** 2231. **20.** 2709. **21.** 3060. **22.** 3649. **23.** 1225. **24.** 4335. **25.** 918. **26.** 1185. **27.** 3468. **28.** 1728. **29.** 1078. **30.** 1275. **31.** 2263. **32.** 2788. **33.** 1071. **34.** 1176. **35.** 1272. **36.** 1197. **37.** 3692. **38.** 1508. **39.** 2368. **40.** 1504. **41.** 3430. **42.** 5106. **43.** 7031. **44.** 3854. **45.** 7098.

Page 194. — **1.** $26.25. **2.** $58.50.

Page 195. — **1.** $17.55. **2.** $16.80. **3.** $5.75. **4.** $107.88. **5.** $29.28. **6.** $23.38. **7.** $14.31. **8.** $340.83. **9.** $201.64. **10.** $11.56. **11.** $43.68. **12.** $153.34. **13.** $247.32. **14.** $13.26. **15.** $74.00. **16.** $301.15 **17.** $42.84. **18.** $94.24. **19.** $334.08. **20.** $230.77. **21.** $267.12. **22.** $426.72. **23.** $196.52. **24.** $96.85. **25.** $36.48. **26.** $34.02. **27.** $234.09. **28.** $515.48. **29.** $28.86. **30.** $352.31. **31.** $167.48. **32.** $289.44. **33.** $108.00. **34.** $290.29. **35.** $332.94. **36.** $186.96. **37.** $58.83. **38.** $157.92. **39.** $449.88. **40.** $49.28. **41.** $143.85. **42.** $223.44. **43.** $53.89. **44.** $270.66. **45.** $79.68. **46.** $218.29.

Page 199. — **3.** $31\frac{1}{2}$. **4.** $15\frac{3}{5}$. **5.** $12\frac{1}{4}$. **6.** $12\frac{3}{5}$. **7.** $9\frac{3}{8}$. **8.** $57\frac{1}{2}$. **9.** $142\frac{2}{3}$. **10.** $59\frac{3}{4}$. **11.** $74\frac{2}{5}$. **12.** $17\frac{1}{8}$.

Page 200. — **1.** $2\frac{1}{2}$¢. **2.** $3\frac{1}{8}$¢. **3.** $12\frac{1}{2}$¢. **4.** $\frac{1}{3}$¢. **5.** $4\frac{1}{6}$¢. **6.** $33\frac{1}{3}$¢; $37\frac{1}{2}$¢; $62\frac{1}{2}$¢; $43\frac{3}{4}$¢. **7.** $387\frac{1}{2}$. **8.** $76\frac{2}{3}$. **9.** $59\frac{1}{8}$. **10.** $118\frac{1}{8}$. **11.** $187\frac{3}{4}$. **12.** $79\frac{3}{5}$. **13.** $84\frac{5}{7}$. **14.** $259\frac{1}{2}$. **15.** $72\frac{4}{9}$. **16.** $59\frac{3}{8}$. **17.** $148\frac{5}{6}$. **18.** $95\frac{1}{4}$. **19.** $298\frac{1}{3}$. **20.** $39\frac{1}{8}$. **21.** $106\frac{3}{7}$. **22.** $.46\frac{4}{5}$. **23.** $2.36\frac{3}{4}$. **24.** $.59\frac{1}{7}$. **25.** $.47\frac{5}{8}$. **26.** $1.30\frac{1}{6}$.

Page 201. — **3.** $.27.

Page 202. — **1.** 66 bags. **2.** $15\frac{3}{4}$ miles. **3.** 17¢. **4.** 35 pupils. **5.** $223\frac{3}{4}$ miles. **6.** $58\frac{3}{4}$ lb. **7.** $50\frac{3}{8}$ in.

Page 203. — **1.** 86. **2.** 90; yes. **3.** 88. **4.** 87. **5.** 95. **6.** 91; Jennie. **7.** $86\frac{1}{8}$. **8.** 75. **9.** 79.

Page 205. — **1.** 23. **2.** 34. **3.** 43. **4.** 22. **5.** 45. **6.** 36. **7.** 17. **8.** 41. **9.** 324. **10.** 181. **11.** 421. **12.** 647. **13.** 556. **14.** 239. **15.** 438. **16.** 349. **17.** 263. **18.** 465. **19.** 831. **20.** 381. **21.** 31. **22.** 13. **23.** 32. **24.** 45. **25.** 64. **26.** 57. **27.** 41. **28.** 83. **29.** 443. **30.** 374. **31.** 322. **32.** 727. **33.** 331. **34.** 266. **35.** 414. **36.** 358. **37.** 433. **38.** 397. **39.** 123. **40.** 369.

Page 206. — **3.** 3 rows; 3 chairs left.

Page 207. — **1.** 33. **2.** 23. **3.** 22. **4.** 42. **5.** 51. **6.** 71. **7.** 52. **8.** 61. **9.** 213. **10.** 233. **11.** 428. **12.** 424. **13.** 24. **14.** 25. **15.** 34. **16.** 45. **17.** 432. **18.** 343. **19.** 244. **20.** 241.

Page 208. — **1.** 21 stamps. **2.** 31. **3.** 21. **4.** 22. **5.** 33. **6.** 42. **7.** 22. **8.** 34. **9.** 42. **10.** 32. **11.** 62. **12.** 83. **13.** 55. **14.** 94. **15.** 72. **16.** 413. **17.** 53. **18.** 62. **19.** 72. **20.** 31. **21.** 21. **22.** 28. **23.** 25. **24.** 21. **25.** 24. **26.** 47. **27.** 241. **28.** 332.

Page 209. — **1.** 27. **2.** 31. **3.** 32. **4.** 26. **5.** 21. **6.** 24. **7.** 13. **8.** 16. **9.** 15. **10.** 12. **11.** 14. **12.** 13. **13.** 14. **14.** 12. **15.** 11. **16.** 9. **17.** 16. **18.** 61. **19.** 43. **20.** 31. **21.** 21. **22.** 21. **23.** 21. **24.** 21. **25.** 53. **26.** 65. **27.** 69. **28.** 51. **29.** 73. **30.** 43. **31.** 44. **32.** 53. **33.** 64. **34.** 71. **35.** 62. **36.** 47. **37.** 136. **38.** 123. **39.** 126. **40.** 226. **41.** 113. **42.** 116. **43.** 225. **44.** 122. **45.** 52. **46.** 54. **47.** 42. **48.** 124. **49.** 33. **50.** 62. **51.** 231.

Page **210**. — **1**. 13 hr. **2**. 12 hr. **3**. 23 miles. **4**. 22 miles. **5**. 17 miles; no. **6**. 67. **7**. 64. **8**. 94. **9**. 61. **10**. 141. **11**. 151. **12**. 135. **13**. 233. **14**. 142. **15**. 123. **16**. 367. **17**. 529. **18**. 183. **19**. 853. **20**. 319. **21**. 916. **22**. 528. **23**. 245. **24**. 472. **25**. 713. **26**. 452. **27**. 453. **28**. 736. **29**. 425. **30**. 953. **31**. 514. **32**. 736. **33**. 332. **34**. 253. **35**. 518.

Page **211**. — **1**. \$3.15. **2**. \$.21. **3**. \$8.37. **4**. \$6.13. **5**. \$7.12. **6**. \$5.21. **7**. \$7.18. **8**. \$2.11. **9**. \$3.34. **10**. \$3.18. **11**. \$4.27. **12**. \$4.13. **13**. \$7.18. **14**. \$7.21. **15**. \$.25. **16**. \$.54. **17**. \$.71. **18**. \$.93. **19**. \$.71. **20**. \$.66.

Page **212**. — **1**. 14 strings, 32 beads left. **2**. 91. **3**. 325 *R* 11. **4**. 86 *R* 15. **5**. 136 *R* 7. **6**. 46 *R* 18. **7**. 123 *R* 23. **8**. 62 *R* 6. **9**. 231 *R* 28. **10**. 45. **11**. 98 *R* 11. **12**. 51 *R* 13. **13**. 52 *R* 36. **14**. \$.57 *R* 5¢. **15**. \$1.45 *R* 15¢. **16**. \$.54 *R* 7¢. **17**. \$2.17 *R* 13¢. **18**. \$1.11. **19**. \$.35 *R* 10¢.

Page **214**. — **1**. 20 times as high. **2**. \$809. **3**. 50 miles. **4**. 202 tons. **5**. 105 bulbs. **6**. 506. **7**. 420. **8**. 906. **9**. 607. **10**. 509 *R* 6. **11**. 609. **12**. 418. **13**. 840. **14**. 604. **15**. 438. **16**. 604. **17**. 706. **18**. 160. **19**. 308 *R* 10. **20**. 840. **21**. 741 *R* 13. **22**. 503. **23**. 730. **24**. \$3.08 *R* 2¢. **25**. \$1.50. **26**. \$1.50. **27**. \$2.06. **28**. \$1.70 *R* 30¢. **29**. \$1.03. **30**. \$3.07. **31**. \$1.40. **32**. \$2.09 *R* 2¢.

Page **215**. — **1**. 7 *R* 3. **2**. 8 *R* 25. **3**. 8 *R* 15. **4**. 7 *R* 39. **5**. 3 *R* 68. **6**. 2 *R* 65. **7**. 8 *R* 33. **8**. 4 *R* 56.

Page **216**. — **1**. \$3.83. **2**. 19. **3**. 37. **4**. 29. **5**. 19. **6**. 28. **7**. 29. **8**. 29. **9**. 27. **10**. 24. **11**. 19. **12**. 78. **13**. 19. **14**. 29. **15**. 37. **16**. 58. **17**. 86. **18**. 298. **19**. 188. **20**. 291. **21**. 192. **22**. 186. **23**. 159. **24**. 378. **25**. 267. **26**. 77. **27**. 377 *R* 6. **28**. 345 *R* 9.

Page **217**. — **1**. 34 crates. **2**. \$3.97. **3**. 4 pieces, 20 pieces left. **4**. 7 marbles, 12 marbles left. **5**. 29. **6**. 19 *R* 7. **7**. 28 *R* 4. **8**. 36 *R* 1. **9**. 19. **10**. 290. **11**. 68. **12**. 79 *R* 11. **13**. 49 *R* 36. **14**. 59. **15**. 69. **16**. 273 *R* 16. **17**. 363. **18**. 29. **19**. 39. **20**. 189. **21**. 292 *R* 14. **22**. 347 *R* 19. **23**. 49 *R* 2. **24**. 66 *R* 24. **25**. \$3.95 *R* 26¢. **26**. \$2.88. **27**. \$4.36. **28**. \$4.86. **29**. \$6.70. **30**. \$2.97. **31**. \$3.80. **32**. \$5.73 *R* 28¢. **33**. \$3.95. **34**. \$4.80.

Page **218**. — **1**. 23. **2**. 28. **3**. 35. **4**. 36. **5**. 39. **6**. 45. **7**. 31. **8**. 36. **9**. 43. **10**. 36. **11**. 38. **12**. 36. **13**. 34. **14**. 44. **15**. 2893. **16**. 3193. **17**. 2925. **18**. 3611. **19**. 3379. **20**. 3909. **21**. 3232. **22**. 2965. **23**. 3187. **24**. 2750.

Page **219**. — **1**. 399. **2**. 598. **3**. 190. **4**. 412. **5**. 297. **6**. 288. **7**. 196. **8**. 258. **9**. 468. **10**. 73. **11**. 75. **12**. 264. **13**. 168. **14**. 219. **15**. 578. **16**. 88. **17**. 345. **18**. 58. **19**. 457. **20**. 343. **21**. 4260. **22**. 3762. **23**. 6779. **24**. 5759. **25**. 2140. **26**. 1640. **27**. 3293. **28**. 6267. **29**. 5779. **30**. 1851.

31. 6179. **32.** 9360. **33.** 5518. **34.** 6359. **35.** 5945. **36.** 2431. **37.** 6547. **38.** 1057. **39.** 7778. **40.** 5875.

Page 220. — **1.** $1432.08. **2.** $160.16. **3.** $2750.82. **4.** $1538.73. **5.** 155,406. **6.** 203,109. **7.** 68,796. **8.** 81,732. **9.** 312,550. **10.** 322,248. **11.** 111,805. **12.** 357,901. **13.** 29,574. **14.** 178,038. **15.** 150,084. **16.** 105,198. **17.** 345,594. **18.** 625,950. **19.** 253,330. **20.** 616,140.

Page 221. — **5.** 18,625. **6.** 1845. **7.** 4968. **8.** 21,590. **9.** 25,432.

Page 222. — **1.** 257,712. **2.** 304,470. **3.** 175,423. **4.** 104,704. **5.** 493,640. **6.** 491,790. **7.** 285,824. **8.** 379,370. **9.** 217,080. **10.** 191,425. **11.** 285,512. **12.** 850,080.

Page 223. — **1.** $1074.60. **2.** $516.75. **3.** $986.25. **4.** $24,610. **5.** $802.72. **6.** $1900. **7.** $75,555. **8.** $287,525. **9.** 92,380 miles. **10.** 1495 miles.

Page 224. — **1.** $336. **2.** 252 lb. **3.** 144 lb. **4.** $1308. **5.** $6096. **6.** $4095. **7.** $7.65. **8.** $6.51. **9.** $12.72. **10.** 268 pears. **11.** 170 pens. **12.** 147 ft.

Page 225. — **1.** $652. **2.** $551.25. **3.** $14.70; $41.88. **4.** $2407. **5.** 8760 hr. **6.** 3700 apples. **7.** $10,675. **8.** $1710.

Page 227. — **1.** A little over 28 apples. **2.** A little over 24 apples. **3.** 3 *R* 9. **4.** 3 *R* 6. **5.** 3 *R* 20. **6.** 7 *R* 11. **7.** 5 *R* 18. **8.** 7 *R* 17. **9.** 3 *R* 8. **10.** 8 *R* 15. **11.** 32 *R* 4. **12.** 21 *R* 2. **13.** 21 *R* 52. **14.** 64 *R* 12. **15.** 66 *R* 35. **16.** 52 *R* 41. **17.** 44 *R* 26. **18.** 43 *R* 15. **19.** 121 *R* 9. **20.** 233 *R* 7.

Page 228. — **1.** 5 shelves; yes. **2.** 4 cakes, 6¢ left. **3.** 3 records, 7¢ left. **4.** 15 hr. **5.** 97 *R* 20. **6.** 31 *R* 46. **7.** 31 *R* 21. **8.** 33 *R* 15. **9.** 32 *R* 9. **10.** 33 *R* 14. **11.** 62 *R* 5. **12.** 73 *R* 12. **13.** 78 *R* 54. **14.** 63 *R* 23. **15.** 349 *R* 20. **16.** 125 *R* 21. **17.** 225 *R* 19. **18.** 209 *R* 12. **19.** 143 *R* 23. **20.** 277 *R* 10. **21.** 331 *R* 7. **22.** 207 *R* 15. **23.** 31 *R* 11. **24.** 74 *R* 26. **25.** 434 *R* 12. **26.** 221 *R* 30. **27.** 624 *R* 13. **28.** 737 *R* 8. **29.** 642 *R* 12. **30.** 408 *R* 13. **31.** 218 *R* 82. **32.** 355 *R* 9. **33.** 564 *R* 39. **34.** 496 *R* 94.

Page 229. — **1.** 3 *R* 2. **2.** 2 *R* 5. **3.** 1 *R* 38. **4.** 3 *R* 6. **5.** 3 *R* 7. **6.** 6 *R* 4. **7.** 6 *R* 2. **8.** 7 *R* 5. **9.** 8 *R* 4. **10.** 9 *R* 4. **11.** 9 *R* 58. **12.** 9 *R* 7. **13.** 7 *R* 11. **14.** 4 *R* 4. **15.** 7 *R* 7.

Page 230. — **1.** $9.10. **2.** $.35. **3.** $.35. **4.** 3 tickets. **5.** 25 flowers. **6.** 31 *R* 12. **7.** 73 *R* 21. **8.** 61 *R* 3. **9.** 81 *R* 3. **10.** 62 *R* 21. **11.** 31 *R* 15. **12.** 53 *R* 15. **13.** 71 *R* 15. **14.** 43 *R* 18. **15.** 71 *R* 4. **16.** 64. **17.** 64 *R* 11. **18.** 38 *R* 7. **19.** 36. **20.** 58. **21.** 47 *R* 4. **22.** 34. **23.** 43 *R* 5. **24.** 85. **25.** 76. **26.** 602 *R* 22. **27.** 359. **28.** 621. **29.** 739. **30.** 604. **31.** 678. **32.** 212 *R* 66. **33.** 413. **34.** 709. **35.** 608.

Page 231. — **1.** 1 *R* 1. **2.** 2 *R* 18. **3.** 1. **4.** 0 *R* 54. **5.** 2 *R* 17. **6.** 1 *R* 2. **7.** 1 *R* 2. **8.** 2 *R* 8. **9.** 1 *R* 1. **10.** 0 *R* 13. **11.** 0 *R* 23. **12.** 1 *R* 1. **13.** 3 *R* 18. **14.** 0 *R* 43. **15.** 1. **16.** 1 *R* 1. **17.** 0 *R* 22. **18.** 3 *R* 6. **19.** 3 *R* 9. **20.** 0 *R* 5.

Page 232. — **1.** 111 miles. **2.** $1.08. **3.** 11 *R* 1. **4.** 10. **5.** 106 *R* 35. **6.** 102 *R* 49. **7.** 106 *R* 24. **8.** 103 *R* 4. **9.** 104 *R* 19. **10.** 101 *R* 14. **11.** 104 *R* 13. **12.** 104 *R* 10. **13.** 104 *R* 19. **14.** 103 *R* 13. **15.** 11. **16.** 11 *R* 2. **17.** 11 *R* 4. **18.** 103 *R* 37. **19.** 105 *R* 20. **20.** 10 *R* 31.

1. 75. **2.** 28 *R* 10. **3.** 87 *R* 25. **4.** 331. **5.** 63. **6.** 104. **7.** 62 *R* 35. **8.** 63 *R* 17. **9.** 61. **10.** 57. **11.** 39. **12.** 87 *R* 64. **13.** 47. **14.** 117. **15.** 221 *R* 29. **16.** 571 *R* 30. **17.** 278. **18.** 701. **19.** 414. **20.** 570. **21.** 806.

Page 234. — **1.** 243 miles. **2.** 359 miles. **3.** 415 miles. **4.** 376 miles. **5.** 357 miles. **6.** 513 miles. **7.** 275 miles. **8.** 454 miles. **9.** 32. **10.** 51. **11.** 37. **12.** 17. **13.** 64. **14.** 59. **15.** 58. **16.** 58. **17.** 65. **18.** 6 *R* 13. **19.** 566 *R* 4. **20.** 316 *R* 4. **21.** 426. **22.** 347. **23.** 83 *R* 2. **24.** 97. **25.** 609. **26.** 380 *R* 9. **27.** 734. **28.** 173. **29.** 804. **30.** 936. **31.** 667. **32.** 944 *R* 7. **33.** 678 *R* 6. **34.** 625. **35.** 764. **36.** 733 *R* 4. **37.** 825 *R* 3. **38.** 720.

Page 235. — **1.** Wrong, 305 correct answer. **2.** Wrong, 43 correct answer. **3.** Wrong, 310 correct answer. **4.** Right. **5.** Wrong, 86 correct answer. **6.** Right. **7.** Wrong, 335 correct answer. **8.** Wrong, 82 *R* 12 correct answer. **9.** Right. **10.** Wrong, 438 *R* 6 correct answer. **11.** Right. **12.** Right. **13.** Wrong, 741 *R* 78 correct answer. **14.** Wrong, 783 *R* 35 correct answer. **15.** Right. **16.** Wrong, 372 *R* 31 correct answer.

Page 236. — **1.** 13 mo. **2.** 14 mo. **3.** 14 wk.

1. 317. **2.** 55. **3.** 504. **4.** 134. **5.** 53 *R* 52. **6.** 64. **7.** 115. **8.** 58. **9.** 273. **10.** 42 *R* 30. **11.** 66 *R* 71. **12.** 44 *R* 25. **13.** 91. **14.** 55 *R* 3. **15.** 59. **16.** 127. **17.** 32 *R* 2. **18.** 109. **19.** 273. **20.** 322 *R* 9. **21.** 508 *R* 6. **22.** 63 *R* 32. **23.** 71. **24.** 303. **25.** 37 *R* 41. **26.** 607. **27.** 685 *R* 20. **28.** 515. **29.** 285. **30.** 650 *R* 15. **31.** 610. **32.** 514. **33.** 703 *R* 4. **34.** 388 *R* 12. **35.** 402 *R* 11. **36.** 509 *R* 42. **37.** 443 *R* 42. **38.** 871. **39.** 440.

Page 237. — **4.** $123.75. **5.** $182. **6.** 8 men. **7.** 6000 lb. **8.** 80 da.

Page 239. — **1.** 32°; 76°; 86°; 8° below zero. **2.** 6°. **3.** 32°. **4.** 12°. **5.** 46°; yes. **7.** 78°.

Page 240. — **1.** $20.23. **2.** 165 miles. **3.** $8.87. **4.** $4.90. **5.** $.27. **6.** 12 mo. **7.** 277 children. **8.** 85.

Page 241. — **1.** 3456 plants. **2.** 211 dozen; $88.62. **3.** $38.79. **4.** $.74. **5.** $2.27. **6.** $356.75. **7.** 15 pieces.

Page 242. — **1.** 471. **2.** 525. **3.** 547. **4.** 395. **5.** 508. **6.** 380. **7.** $278.86. **8.** $524.52. **9.** $107.81. **10.** $229.94. **11.** 76,483. **12.** 303,030. **13.** 130,410. **14.** 370,980. **15.** 152,250. **16.** 293,811. **17.** 21 *R* 2, or $21\frac{2}{7}$. **18.** 42 *R* 7, or $42\frac{7}{9}$. **19.** 51 *R* 5, or $51\frac{5}{8}$. **20.** 103. **21.** 150. **22.** 65. **23.** 225. **24.** 224. **25.** 83. **26.** 35 *R* 2. **27.** 171 *R* 3. **28.** 150. **29.** 209. **30.** 67. **31.** 447. **32.** 739. **33.** 527. **34.** 964 *R* 7. **35.** 764. **36.** 637. **37.** 845 *R* 70.

Page 244. — **8.** 18,023,104. **9.** 13,150,079. **10.** 40,006,007. **11.** 156,000,200. **12.** 7,500,000. **14.** 999,999; 100,000; 9,999,999; 1,000,000.

Page 246. — **1.** 1808. **2.** $7.50. **4.** 34 volumes. **5.** $20. **6.** The nickel. **7.** 31; 56; 75; 1499. **8.** 63; 102; 2110; 1855. **9.** 97; 210; 1610; 1905. **10.** 49; 601; 640; 1492. **11.** XLVIII; LXXIX; CIV; DCXXXVI; MCCXX; MDCCCLXXXIV. **12.** LXIV; XCIX; CDLXXXVII; DCCCXLIII; MDXXXV; MCMXV, or MDCCCCXV.

Page 247. — **1.** 588. **2.** 505. **3.** 504. **4.** 571. **5.** 402. **6.** 531. **7.** 123,516. **8.** 79,110. **9.** 111,359. **10.** 141,007. **11.** 60. **12.** 57. **13.** 66. **14.** 60. **15.** 68. **16.** 59. **17.** 49.

Page 248. — **1.** 41,349. **2.** 37,007. **3.** 38,624. **4.** 38,071. **5.** 44,139. **6.** 36,033. **7.** 40,066. **8.** 43,743. **9.** $965.11. **10.** $1052.09. **11.** $1011.35. **12.** $1507.33. **13.** $2049.27. **14.** $1534.63. **15.** $3155.72. **16.** $2095.61.

Page 249. — **1.** 139 stamps. **2.** 551 people. **3.** $1695. **4.** $119.53. **5.** $3876.39. **6.** $2684.36. **7.** $236.90. **8.** $5791.37. **9.** $4571.84. **10.** $6895.44. **11.** $7725.08. **12.** $1088.57. **13.** $4689.02. **14.** $5372.99. **15.** $139.60. **16.** $5957.69. **17.** $3907.86. **18.** $2905.57. **19.** $3898.29. **20.** $8247.05. **21.** $2950.54. **22.** $6633.79. **23.** $8175.87. **24.** $1371.55.

Page 250. — **1.** $1813.50. **2.** 119,106. **3.** 576,008. **4.** 374,067. **5.** 230,728. **6.** 312,650. **7.** 600,750. **8.** 99,900. **9.** 215,330. **10.** 565,110. **11.** 316,750.

Page 251. — **1.** $411.75. **2.** $414.00. **3.** $486.75. **4.** 244,545. **5.** 38,055. **6.** 563,652. **7.** 149,823. **8.** 316,125. **9.** 510,874. **10.** 795,626. **11.** 488,948. **12.** 834,426. **13.** 197,443. **14.** 475,020. **15.** 458,900. **16.** 259,440. **17.** 242,530. **18.** 255,780. **19.** $8171.86. **20.** $3093.75. **21.** $6657.58. **22.** $733.32. **23.** $1851.21. **24.** 5,560,320. **25.** 5,372,100. **26.** 5,704,140. **27.** 2,577,700. **28.** 673,180.

Page 253. — **1.** 71. **2.** 73 *R* 2. **3.** 65. **4.** 31 *R* 16. **5.** 53. **6.** 27 *R* 3. **7.** 68. **8.** 69 *R* 15. **9.** 67. **10.** 39. **11.** 521 *R* 9. **12.** 730. **13.** 761 *R* 13. **14.** 297. **15.** 756 *R* 6.

Page 254. — **1.** 76 *R* 30. **2.** 62 *R* 4. **3.** 97 *R* 29. **4.** 46 *R* 31. **5.** 57 *R* 35. **6.** 74 *R* 72. **7.** 51. **8.** 71. **9.** 53 *R* 42. **10.** 83. **11.** 41. **12.** 62 *R* 42. **13.** 416 *R* 11. **14.** 583 *R* 32. **15.** 747 *R* 42. **16.** 402 *R* 14. **17.** 623. **18.** 413 *R* 9. **19.** $.28

Page **255**. — **1**. 49 jelly beans, 15 jelly beans left. **2**. 13 eggs, 5¢ left. **3**. $.48. **4**. $1.75. **5**. 66 *R* 52. **6**. 240. **7**. 57. **8**. 61. **9**. 56 *R* 40. **10**. 78 *R* 12. **11**. 67 *R* 26. **12**. 270. **13**. 39. **14**. 41. **15**. 104. **16**. 203. **17**. 77. **18**. 622 *R* 10. **19**. 625. **20**. 371 *R* 40. **21**. 702. **22**. 206. **23**. 492. **24**. 354. **25**. 509. **26**. 507. **27**. 603. **28**. 236. **29**. 557 *R* 11. **30**. 2775 *R* 5. **31**. 2093 *R* 3. **32**. 722 *R* 20. **33**. 273 *R* 33. **34**. 403. **35**. 510. **36**. 264. **37**. 654 *R* 42. **38**. 223 *R* 41. **39**. 414. **40**. 827 *R* 22. **41**. 810. **42**. 517. **43**. 408 *R* 13.

Page **256**. — **2**. 194⅜ miles. **3**. 120 miles; no. **4**. 76 lb. **5**. 85. **6**. $.63.

Page **257**. — **1**. 2. **2**. 2. **3**. 3. **4**. 4. **5**. 2. **6**. 6. **7**. 4. **8**. 2. **9**. 2. **10**. 3. **11**. 2. **12**. 2. **13**. 12. **14**. 24. **15**. 26. **16**. 22. **17**. 4. **18**. 3. **19**. 40 suits. **20**. 8 mo.

Page **259**. — **1**. 23 miles. **2**. 21 miles. **3**. 22 miles. **4**. 24 miles. **5**. Mr. Ross. **6**. 21. **7**. 13. **8**. 32. **9**. 25. **10**. 16. **11**. 24. **12**. 26. **13**. 17. **14**. 31. **15**. 24 *R* 11. **16**. 23 *R* 83. **17**. 17. **18**. 117 *R* 249. **19**. 367. **20**. 213 *R* 198. **21**. 21. **22**. 36. **23**. 82 *R* 119. **24**. 75. **25**. 41 *R* 301. **26**. 71. **27**. 709. **28**. 431 *R* 411. **29**. 351.

Page **260**. — **1**. 13 times. **2**. 34. **3**. 28. **4**. 27. **5**. 19. **6**. 19. **7**. 28. **8**. 34. **9**. $.79. **10**. $.46. **11**. $.76. **12**. $.85. **13**. $1.91. **14**. $3.42. **15**. $1.81.

Page **262**. — **1**. 144 miles. **2**. Slightly over 27 miles; 28 da. 15 hr. **3**. 22 *R* 78. **4**. 24 *R* 118. **5**. 14 *R* 125. **6**. 19 *R* 391. **7**. 20. **8**. 31. **9**. 26. **10**. 17 *R* 250. **11**. 21. **12**. 211. **13**. 109. **14**. 129 *R* 65. **15**. 224 *R* 22. **16**. 97 *R* 800. **17**. 132. **18**. 208. **19**. 174 *R* 68. **20**. 31 *R* 50. **21**. 34. **22**. 260. **23**. 25 *R* 25. **24**. 57. **25**. 31 *R* 36. **26**. 204. **27**. 61. **28**. 71 *R* 42. **29**. 73. **30**. 52.

Page **264**. — **1**. 36 in.; 9 in. **2**. 27 in. **3**. 18 in. **7**. 8; 6; 1500. **8**. 30; 6; 45. **9**. 2; 6; 40. **10**. 6; 12; 10. **11**. 2; 14; 9.

Page **265**. — **1**. 27¢. **2**. 36¢. **3**. 25¢. **4**. 10¢; 20¢; 15¢; 30¢; 35¢. **6**. $1.08. **7**. $.96. **8**. $.85. **9**. $1.12. **10**. 27; 24; 33; 78; 267; 339. **11**. 54; 48; 66; 156; 534; 678.

Page **266**. — **1**. $24. **2**. $6.25. **3**. $1.90; $.95. **4**. $2.10. **5**. $5.25; $1.75. **6**. 96. **7**. 420. **8**. 242. **9**. 66. **10**. 217. **11**. 684. **12**. 369. **13**. 348. **14**. $.98. **15**. $2.22. **16**. $3.98. **17**. $3.36. **18**. $1.00. **19**. $2.31. **20**. $2.22. **21**. $5.65. **22**. $41.73. **23**. $61.00. **24**. $29.73. **25**. $62.14. **26**. $62.95. **27**. $35.37. **28**. $11.08. **29**. $29.75.

Page **267**. — **3**. $1.25. **4**. 55¢. **5**. 68¢. **6**. $1.10.

Page **268**. — **1**. $29.25. **2**. $10.44. **3**. $9.35. **4**. $12.25. **5**. $2.25. **6**. $195.75. **7**. $10.50. **8**. $1.72. **9**. 30¢. **10**. $3.78. **11**. $1.35. **12**. 50¢. **13**. 27¢. **14**. $1.56.

15. \$2.53. **16.** \$7.00. **17.** \$3.15. **18.** \$1.14. **19.** \$2.97.
20. \$2.59. **21.** \$3.00. **22.** \$8.17. **23.** 99¢. **24.** \$2.96.
25. \$1.15. **26.** \$2.03. **27.** 80¢. **28.** \$1.36. **29.** \$1.72.
30. \$5.27. **31.** \$13.86. **32.** \$9.10. **33.** \$21.09. **34.** \$15.80.
35. \$8.36. **36.** \$49.40. **37.** \$11.78. **38.** \$17.22.

Page 271. — **1.** $3\frac{1}{2}$ lb. **2.** $2\frac{1}{4}$ yd. **3.** $1\frac{1}{4}$. **4.** 3. **5.** 2.
6. $1\frac{3}{8}$. **7.** $1\frac{1}{8}$. **8.** $1\frac{1}{3}$. **9.** $1\frac{5}{8}$. **10.** $2\frac{1}{3}$. **11.** $1\frac{1}{8}$. **12.** $1\frac{3}{8}$.
13. 3. **14.** $1\frac{7}{8}$. **15.** $2\frac{1}{8}$. **16.** 2. **17.** $2\frac{3}{4}$.

Page 272. — **4.** $\frac{2}{3}$; $\frac{5}{8}$; $\frac{3}{4}$. **5.** $\frac{7}{8}$. **6.** $\frac{3}{8}$. **7.** $\frac{5}{6}$. **8.** $\frac{3}{4}$. **9.** $\frac{2}{3}$.
10. $\frac{7}{8}$.

Page 273. — **1.** 1 lb. **2.** $1\frac{1}{8}$ in. **3.** 1 lb. **4.** 2. **5.** $1\frac{3}{4}$.
6. 1. **7.** $1\frac{1}{8}$. **8.** $1\frac{1}{3}$. **9.** 1. **10.** $1\frac{3}{8}$. **11.** 1. **12.** 1.
13. $1\frac{5}{8}$. **14.** $1\frac{1}{8}$. **15.** $1\frac{1}{4}$. **16.** $1\frac{1}{8}$. **17.** 2.

Page 274. — **1.** 9 lb. **2.** $6\frac{1}{4}$ yd. **3.** 8. **4.** 6. **5.** 8. **6.** $9\frac{1}{4}$.
7. $10\frac{1}{3}$.

Page 275. — **1.** 2 hr. **2.** $1\frac{1}{2}$ hr. **3.** $5\frac{1}{4}$ hr. **4.** $3\frac{3}{4}$ lb.
1. $5\frac{3}{8}$. **2.** 12. **3.** $6\frac{3}{4}$. **4.** 8. **5.** $7\frac{3}{8}$. **6.** 15. **7.** $12\frac{3}{8}$.
8. $10\frac{5}{8}$. **9.** $10\frac{1}{3}$. **10.** 15. **11.** $7\frac{1}{2}$. **12.** $8\frac{1}{4}$. **13.** $12\frac{1}{8}$.
14. $10\frac{3}{4}$. **15.** 10. **16.** $17\frac{1}{2}$. **17.** $20\frac{1}{4}$. **18.** $11\frac{5}{8}$. **19.** $19\frac{2}{3}$.
20. 19.

Page 276. — **5.** $\frac{3}{4}$ hr. **6.** $1\frac{1}{4}$. **7.** 1. **8.** $1\frac{3}{4}$. **9.** $5\frac{3}{4}$. **10.** $12\frac{1}{4}$.
11. $1\frac{1}{4}$. **12.** 1. **13.** $1\frac{1}{2}$. **14.** $8\frac{3}{4}$. **15.** $10\frac{1}{2}$.

Page 279. — **1.** $\frac{1}{4}$; $\frac{1}{6}$; $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{2}$; $\frac{2}{3}$; $\frac{1}{6}$; $\frac{1}{3}$; $\frac{1}{3}$. **2.** $\frac{3}{4}$ yd.

Page 280. — **1.** $\frac{1}{2}$ lb. **2.** $\frac{3}{4}$ in. **3.** $\frac{1}{2}$ lb. **4.** 1 mile. **5.** $\frac{1}{2}$.
6. $\frac{3}{4}$. **7.** $\frac{1}{2}$. **8.** $\frac{1}{2}$. **9.** $\frac{3}{4}$. **10.** $\frac{3}{4}$. **11.** $1\frac{1}{2}$. **12.** $1\frac{3}{4}$. **13.** $1\frac{1}{4}$.
14. $2\frac{1}{2}$. **15.** $7\frac{1}{2}$. **16.** $10\frac{3}{4}$. **17.** 6. **18.** $9\frac{1}{4}$. **19.** $8\frac{1}{2}$.

Page 281. — **1.** $\frac{5}{8}$. **2.** $\frac{7}{8}$. **3.** $\frac{7}{8}$. **4.** $1\frac{1}{8}$. **5.** $1\frac{3}{8}$. **6.** $\frac{7}{8}$.
7. $\frac{5}{8}$. **8.** $1\frac{1}{8}$. **9.** $1\frac{1}{4}$. **10.** $\frac{3}{4}$. **11.** 1. **12.** $1\frac{1}{2}$. **13.** $1\frac{1}{4}$.
14. $2\frac{1}{4}$. **15.** $\frac{3}{4}$.

Page 282. — **1.** $9\frac{1}{4}$ lb. **2.** $5\frac{7}{8}$ lb. **3.** $11\frac{1}{4}$. **4.** $16\frac{1}{4}$. **5.** $7\frac{3}{8}$.
6. $7\frac{1}{4}$. **7.** $7\frac{1}{2}$. **8.** $10\frac{5}{8}$. **9.** $11\frac{3}{4}$. **10.** $8\frac{1}{8}$. **11.** $11\frac{3}{8}$. **12.** $15\frac{3}{8}$.
13. 8. **14.** $12\frac{1}{4}$. **15.** $16\frac{1}{2}$. **16.** $16\frac{1}{4}$. **17.** $9\frac{3}{4}$.

Page 283. — **1.** 589. **2.** 601. **3.** 488. **4.** 596. **5.** 425.
6. 620. **7.** 47,038. **8.** 41,755. **9.** 28,290. **10.** 40,484.
11. 44,726. **12.** 41,161. **13.** 34,006. **14.** 45,333.

Page 284. — **1.** 3217. **2.** 1773 miles. **3.** \$10,250. **4.** \$7873.83.
5. \$2934.57. **6.** \$6981.83. **7.** \$2092.65. **8.** \$3363.30.
9. \$5984.48. **10.** \$6145.80. **11.** \$5610.79. **12.** \$3394.57.
13. \$3667.97. **14.** \$4601.84. **15.** \$1416.92. **16.** \$6267.52.
17. \$1367.85. **18.** \$2584.55.

Page 285. — **1.** $\frac{3}{8}$; $\frac{1}{4}$; $\frac{1}{6}$. **2.** $\frac{1}{2}$ yd. **3.** $\frac{1}{4}$. **4.** $\frac{3}{8}$. **5.** $\frac{1}{8}$.
6. $\frac{1}{4}$. **7.** $\frac{3}{4}$. **8.** $\frac{1}{2}$. **9.** $\frac{3}{4}$. **10.** $\frac{1}{2}$. **11.** $\frac{3}{8}$. **12.** $\frac{3}{4}$. **13.** $\frac{1}{2}$.
14. $\frac{1}{4}$ **15.** $\frac{1}{4}$; $\frac{1}{8}$; $\frac{1}{2}$; $\frac{3}{8}$; $\frac{5}{8}$; $\frac{1}{3}$; $\frac{3}{4}$; $\frac{7}{8}$; $\frac{2}{8}$ or $\frac{1}{4}$.

Page **286**. — **1**. $65\frac{1}{2}$ lb. **2**. Gus; $2\frac{1}{4}$ lb. **3**. $1\frac{1}{2}$ lb. **4**. 67 lb. **5**. $14\frac{1}{2}$ lb. **6**. $2\frac{1}{2}$. **7**. $1\frac{1}{8}$. **8**. $3\frac{1}{4}$. **9**. $5\frac{1}{8}$. **10**. $2\frac{1}{2}$. **11**. $4\frac{3}{8}$. **12**. $1\frac{1}{4}$. **13**. $2\frac{1}{4}$. **14**. $5\frac{3}{8}$. **15**. 1. **16**. $3\frac{3}{4}$. **17**. $3\frac{3}{8}$. **18**. 6. **19**. $1\frac{1}{4}$. **20**. $1\frac{1}{2}$.

Page **287**. — **2**. $2\frac{1}{8}$ min. **3**. $\frac{1}{8}$ min.

1. $\frac{1}{4}$. **2**. $\frac{1}{8}$. **3**. $\frac{7}{8}$. **4**. $\frac{1}{8}$. **5**. $\frac{1}{8}$. **6**. $1\frac{1}{8}$. **7**. $5\frac{1}{4}$. **8**. $2\frac{3}{8}$. **9**. $6\frac{1}{8}$. **10**. $1\frac{1}{8}$. **11**. $4\frac{3}{8}$. **12**. $3\frac{1}{4}$. **13**. $1\frac{5}{8}$. **14**. $5\frac{1}{8}$. **15**. $3\frac{1}{8}$. **16**. $2\frac{1}{8}$. **17**. $2\frac{3}{8}$. **18**. $\frac{1}{4}$. **19**. $2\frac{1}{8}$. **20**. $6\frac{1}{8}$. **21**. $1\frac{7}{8}$. **22**. $5\frac{5}{8}$. **23**. $\frac{1}{4}$. **24**. $4\frac{3}{8}$. **25**. $4\frac{5}{8}$.

Page **288**. — **1**. Red, $16\frac{3}{4}$ yd.; blue, $11\frac{7}{8}$ yd.; yellow, $13\frac{1}{8}$ yd.; white, $10\frac{1}{4}$ yd.; pink, $7\frac{3}{4}$ yd.; green, 10 yd. **2**. $69\frac{3}{4}$ yd.; $16.74.

Page **289**. — **1**. $\$75\frac{1}{2}$. **2**. $\$08\frac{3}{4}$. **3**. $\$49\frac{1}{2}$. **4**. $7\frac{1}{2}$. **5**. $24\frac{1}{2}$. **6**. $15\frac{3}{4}$. **7**. $9\frac{3}{4}$. **8**. $11\frac{1}{4}$. **9**. $23\frac{1}{2}$. **10**. $37\frac{1}{2}$. **11**. $32\frac{1}{4}$. **12**. $22\frac{1}{2}$. **13**. $100\frac{1}{2}$. **14**. $42\frac{1}{2}$. **15**. $102\frac{1}{3}$. **16**. $45\frac{2}{3}$. **17**. $55\frac{1}{4}$. **18**. $163\frac{1}{2}$. **19**. $\$62\frac{1}{2}$. **20**. $144\frac{3}{4}$ miles.

Page **290**. — **1**. 4 P.M.; 4 biscuits. **2**. 5.30 P.M.; 9 examples. **3**. 6.30 P.M. **4**. 6.45 P.M.

Page **292**. — **1**. $1.60. **2**. $1.04. **3**. $10.62. **4**. $11.05. **5**. 1170 miles. **6**. 69 pieces.

Page **293**. — **1**. 84 chickens. **2**. 66 chickens. **3**. 2244 lb.; $67.32. **4**. $91.98. **5**. $45.44. **6**. $123.50. **7**. $76.96.

Page **294**. — **4**. 6 min. **5**. 50 min. **6**. 6 sec.; 9 sec. **7**. 30. **8**. 45. **9**. 240. **10**. 120. **11**. 15. **12**. 90.

Page **295**. — **4**. Train No. 4, 50 min. late; Train No. 23, 35 min. late. **5**. Train No. 127.

Page **297**. — **1**. New Year's Day, Jan. 1; Lincoln's Birthday, Feb. 12; Washington's Birthday, Feb. 22; St. Valentine's Day, Feb. 14; Decoration Day, May 30; Independence Day, July 4; Columbus Day, Oct. 12; Christmas, Dec. 25. **8**. 33 da. **9**. 10 yr.; 24 yr.

Page **299**. — **1**. 264 ft.; 20 blocks. **2**. $\frac{1}{2}$ mi.; 1 mi. **4**. $1\frac{1}{2}$ mi. **5**. 80 rd.; 440 yd. **6**. 6 liners. **7**. 736 ft. **8**. 160; 24; 10,560. **9**. 80; 33; 80. **10**. 15,840; 144; 20. **11**. 2640; 1320; 2. **12**. 880; 660; 330.

Page **300**. — **2**. $4.80. **3**. 100 ft. **4**. $4.00. **6**. 880 ft.; 6 times.

Page **302**. — **4**. 12 sq. in. **5**. 20 sq. in. **6**. 21 sq. in. **7**. 24 sq. in. **8**. 24 sq. in. **9**. 7 sq. in. **10**. 60 sq. in. **11**. 84 sq. in. **12**. 70 sq. in. **13**. 102 sq. in. **14**. 104 sq. in. **15**. 105 sq. in.

Page **303**. — **5**. 15 sq. ft. **6**. 72 sq. ft. **7**. 14 sq. ft. **8**. 30 sq. ft. **9**. 18 sq. ft. **10**. 32 sq. ft. **11**. 7 sq. ft. **12**. 44 sq. ft. **13**. 30 sq. ft. **14**. 91 sq. ft. **15**. 76 sq. ft. **16**. 126 sq. ft. **17**. 360 sq. ft. **18**. Helen's room; 1 sq. ft. **19**. 168 sq. ft.

Page 304. — **2.** \$75.20. **3.** 14 sq. yd.; 46 sq. yd. **4.** 14 sq. yd. **5.** 3 sq. yd. **6.** 12 sq. yd. **7.** 9 sq. yd. **8.** 63 sq. yd. **9.** 1 sq. yd. **10.** 9 sq. yd. **11.** 143 sq. yd. **12.** 378 sq. yd. **13.** 273 sq. yd. **14.** 20 sq. ft.; 20 sq. yd.

Page 305. — **4.** 12 sq. yd. **5.** 12 sq. yd. **6.** 144. **7.** 72. **8.** 432. **9.** 18. **10.** 3. **11.** 2.

Page 306. — **1.** 6 in.; 2 in. **5.** 4 ft.; 8 ft.; 16 ft. **7.** 2 yd.; 8 yd.; 12 yd.

Page 307. — **2.** 2 ft.; 4 ft.; 6 ft. **3.** 6 ft. **4.** 13 ft. **5.** 78 sq. ft. **6.** 6 ft.; 2 ft.; 12 sq. ft. **7.** 3 ft.; 6 ft. **8.** 2 ft.; 8 ft.; 4 ft.; 8 ft.; 16 sq. ft.; 32 sq ft.; 2 times as large.

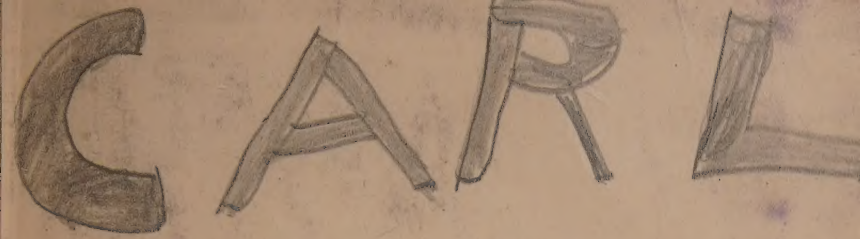
Page 308. — **1.** 2 mi.; 3 mi.; 4 mi.; 8 mi.; 12 mi. **3.** 3 mi. **4.** 6 mi. **5.** 4 mi.; 2 mi. **6.** 8 mi.

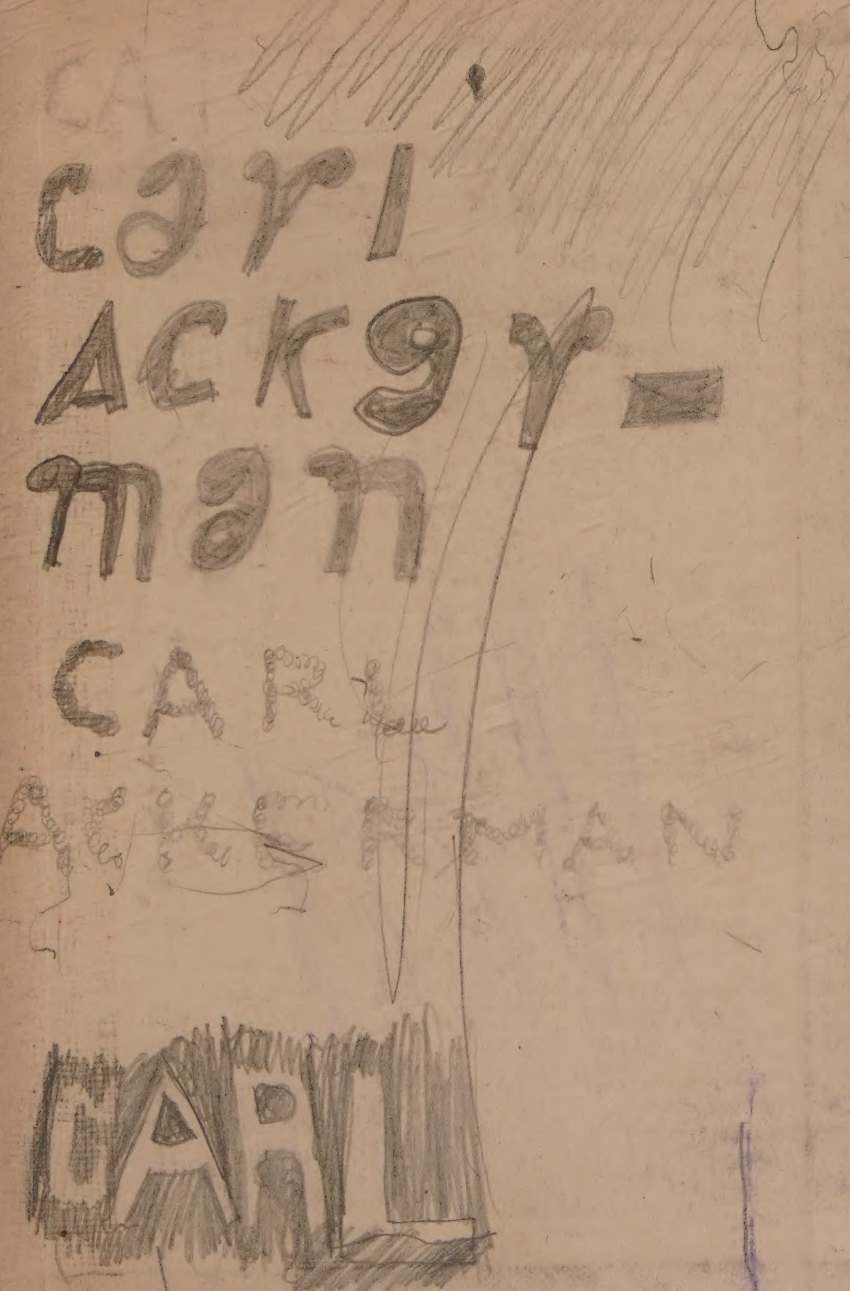
Page 309. — **1.** 92. **2.** \$.19. **3.** \$.93. **4.** $\frac{1}{2}$ lb. **5.** 4 hr. 55 min. **6.** \$59. **7.** 48 sq. ft.

Page 310. — **7.** 71. **8.** 70. **9.** 67. **10.** 71. **11.** 64. **12.** 58. **13.** 60. **14.** \$610.52. **15.** \$345.75. **16.** \$7921.99. **17.** \$2554.79. **18.** \$4632.40. **19.** \$4381.39. **20.** \$1086.30. **21.** \$2428.38.

Page 311. — **1.** 38,119. **2.** 34,360. **3.** 40,750. **4.** 37,931. **5.** \$436.13. **6.** \$389.04. **7.** \$321.22. **8.** \$394.43. **9.** 211,551. **10.** 387,984. **11.** 732,552. **12.** 296,700. **13.** 412,760. **14.** 270,830. **15.** 768,553. **16.** 764,725. **17.** 223,010. **18.** 315,520. **19.** 105 *R* 10. **20.** 151 *R* 38. **21.** 470. **22.** 675 *R* 19. **23.** 205 *R* 108. **24.** 208. **25.** 269 *R* 150. **26.** 508. **27.** 652 *R* 347.

Page 312. — **1.** 1. **2.** $\frac{3}{4}$. **3.** $\frac{7}{8}$. **4.** $9\frac{3}{4}$. **5.** $6\frac{1}{4}$. **6.** 12. **7.** $1\frac{1}{2}$. **8.** $1\frac{5}{8}$. **9.** $1\frac{3}{4}$. **10.** $13\frac{1}{8}$. **11.** $15\frac{1}{8}$. **12.** $14\frac{1}{8}$. **13.** $\frac{7}{8}$. **14.** $1\frac{1}{2}$. **15.** $1\frac{1}{4}$. **16.** $16\frac{1}{4}$. **17.** $16\frac{3}{4}$. **18.** $18\frac{7}{8}$. **19.** $2\frac{1}{4}$. **20.** $5\frac{1}{2}$. **21.** $6\frac{1}{2}$. **22.** $3\frac{1}{4}$. **23.** $5\frac{3}{4}$. **24.** $10\frac{1}{8}$. **25.** $6\frac{1}{8}$. **26.** $4\frac{3}{8}$. **27.** $5\frac{5}{8}$. **28.** $2\frac{3}{8}$. **29.** 81. **30.** 70. **31.** 100. **32.** 60. **33.** \$3.48. **34.** \$6.30. **35.** \$2.42. **36.** \$1.65. **37.** \$3.20. **38.** \$2.85. **39.** \$4.76. **40.** \$2.70. **41.** \$7.81. **42.** \$7.93. **43.** \$3.04. **44.** \$3.15. **45.** \$16.53.


CARL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